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Where's Our Steel?
I Just Ordered it from RYERSON – It Will be Cut and Shipped Tonight You can Depend on it for Tomorrow's Production – RYERSON Hasn't failed Me Yet –
Steel of all kinds in stock for Immediate Shipment. Write for Stock List. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Philadelphia, Boston, Jersey City.

As the Editor Views the News

OUT of the welter of conflicting opinion as to what the vote of Nov. 6 means, industry can be sure of one thing. It is that the forces antagonistic to business and finance will be more strongly entrenched in the next national congress and in many state and local governments than at any time in scores of years. This condition was expected long before election day. The surprise lay, not in the election of a number of widely scattered radicals, but in the general sweeping endorsement of unwise, unsound and potentially dangerous policies which the vote seems to indicate.

• • •

Wild Men In Congress

Disregarding the political aspects of the situation, as well as the Santa Claus element involved in the election, industry is confronted with the immediate problem of planning its offensive against the wild faction of the next congress. Legislation looking toward inflation, payment of the soldiers' bonus, adoption of a blanket 30-hour week, outlawing of employe representation plans, nationalization of banking, and an extension of the present competition of the federal government with private business is likely to be introduced and will find strong support. In state and local government demands for state or municipal ownership of certain utilities will become more emphatic. Everywhere the tendency to shift financial burdens onto industry will be intensified.

• • •

Good Offense Best Defense

The President, by force of circumstances largely of his own making, will be placed in the position of having to work with finance, industry and agriculture against the more radical proposals of the new congress. Industry will be wise to bring to the support of the inevitable coalition of conservatives the most intelligent leadership and the strongest forces it is able to muster. As an example of what industrial leaders should be doing now, consider the question of labor relations. Senator Wagner is certain to renew his proposal for making employe representation plans illegal. While preparing its offense against this discriminatory action, industry also should be launching a campaign to demand that professional labor be made legally responsible for its acts—that it be subject to the same restructions against coercion as are imposed upon employers.

• • •

Presidential Horse Trading

In this and other contests with the radical forces, industry must display a higher degree of skilled generalship and effective teamwork than it has exhibited thus far in this emergency. That it may count on some help from President Roosevelt seems certain. The sensible pronouncements of Secretary Roper, in his address last Wednesday (p. 19), were reassuring—particularly his remarks on labor relations and the profit motive. But industrial leaders must keep constantly in mind the fact that the President—adroit politician that he is—will barter with his radical opponents. It will be industry's job, not the President's, to see that industry's demands do not become the lambs chosen for the sacrificial altar.

• • •

To Level Auto Output

Suppliers of materials and parts for automobiles will watch closely the avowed intention (p. 21) of the motor car industry to level off the peaks and valleys of 1935 production. Initially it means certain dislocations in the steel and parts industries . . . . Dickerson N. Hoover's report on the MORRO CASTLE disaster (p. 17) advocates more fire resistant construction in the superstructure of passenger vessels . . . . W. E. Emmett, district engineer, A. I. S. C., outlines the expanding use of H-piling (p. 35) on the Pacific coast. Examination of piers built six years ago, indicates a probable life of 75 years for H-sections subjected to salt water and the abrasive action of shifting sand. . . . . Susceptibility of steelworkers to heat cramps has been studied scientifically by medical authorities, who analyze (p. 46) various preventive measures.

E. L. Shaner

Washington To Spur Exports Of Iron, Steel, Machinery

FOREIGN trade promotion is beginning to receive an impulse from the new deal, and ambitious plans for expanding exports of iron, steel, machinery and agricultural implements—to cite only products of special interest to the steel industry—are being matured in Washington.

Ralph L. Harding, chief of the iron and steel division of the bureau of foreign and domestic commerce, has just completed a swing to Pittsburgh, Cleveland and Chicago, soliciting co-operation of iron and steel producers and proffering the services of his division, preliminary to a more active campaign.

STEEL ACROSS THE SEAS is the slogan of Ralph L. Harding, chief of the iron and steel division of the department of commerce, who is campaigning for larger exports

R. E. W. Harrison, head of the machinery and agricultural implements division of the same bureau, sensing enlarged opportunities through negotiations for reciprocal trade treaties, is broadening his efforts to make machinery and implement manufacturers more export-conscious.

Secretary of Commerce Roper, under whom both Messrs. Harding and Harrison function, is personally devoting more time and effort to the export phase of his department, as evidenced by his recent address before the National Foreign Trade council convention in New York.

The state department has concluded, under way or on request negotiations for reciprocal trade treaties with some 30 nations. Meanwhile, it is keeping alive negotiations with Russia looking to settlement of the debt question which must precede active foreign trade with the soviet.

Turn From Do-Nothing Policy

The export-import bank set up under George N. Peek to finance foreign trading appears to be moving away from a purely statistical position to one of active helpfulness.

To what extent the department of commerce and its divisions will actively co-operate with producers, say of iron and steel, is not yet determined, but a trend away from the do-nothing policy of the early days of the Roosevelt administration is distinctly visible.

It will be recalled that, largely as a matter of economy, the divisions which Herbert Hoover as secretary of commerce created to promote foreign trade were hamstrung in 1933 by sharply-reduced appropriations, commercial attaches were bundled home on scant notice, and much of the interchange of export-import information was relegated to the consular service and other divisions of the department of state.

Extend Helping Hand

Now, however, the services which the various divisions under Secretary Roper can render individual manufacturers are being stressed, and an era of active co-operation appears at hand. But this outstretched hand probably will not go so far as to actively solicit business abroad, which was the case in the Hoover regime.

Increased exports of iron and steel are being emphasized as a measure toward recovery. In the first nine months of 1934 exports have totaled 2,030,637 tons. Subtracting 1,275,414 tons of scrap, which is not labor-producing, the outward movement was 755,223 tons. In the same period of 1933, exports reached only 834,203 tons, which minus 504,653 tons of scrap left a net of 329,550 tons.

Domestic output of steel ingots does not afford a strictly accurate comparison inasmuch as exports include some pig iron and are chiefly finished products, but it is the best yardstick available. The 755,223 tons of finished products sold abroad in the first three quarters of this year constitute 3.72 per cent of the production of 20,268,462 tons of ingots in the same period. A year ago, the export of 329,550 tons was only 1.84 per cent of the output of 17,189,390 tons of ingots.

In other words, already this year exports of iron and steel have doubled in relation to domestic production. To state it another way, exports have risen 129 per cent over a year ago, while domestic production is up only 12 per cent.

Supply Work for Many

In September, when open-hearth furnaces and bessemer converters made 1,251,630 tons of steel the industry was employing 381,828 persons, the monthly output of steel per person being 3.3 tons. This is far subnormal, as the industry purposely maintained employment on a high level. On this basis, September exports supplied employment for 23,066 persons.

DON'T AMERICANIZE YOUR CUSTOMERS, warns R. E. W. Harrison, head of the machinery and agricultural implements division of the department of commerce, urging a new deal in exports

Speaking before the foreign trade convention in New York Oct. 31 Secretary Roper said:

It may be a remarkable coincidence, but comparisons show that in the past quarter century we have had prosperous conditions in the United States only during those times when our foreign trade was flourishing.

Employment has also reached its peak in this country during those periods when international commerce was at its height. Employment, conversely, has shrunk to the lowest lev-

els during those periods when foreign trade has been the least.

Incidentally, at this convention W. T. Corbett, vice president of the United States Steel Products Co., listed some of the handicaps which American exporters face in Japan. Skilled lathe operators receive $1.57 per day, and foundrymen 92 cents—and the Japanese work day is a long one. He believes, however, some adjustment can be made whereby Japanese imports made with such cheap labor will not upset trade seriously.

James A. Farrell, chairman of the foreign trade council and former president of the United States Steel Corp., urged more intensive development of trade with neighbors of the United States—a view which the iron and steel division of the department of commerce applauds.

New conditions confront the exporter of farm equipment, according to Mr. Harrison:

Competition Is Keener

Much of our past foreign trade was built up on the sale of articles which our customer countries are now as well able to supply themselves as we are; hence, our entry into these markets, or rather re-entry in many cases, must be predicated on new technological developments and the price structure for the old element which will successfully counteract the strengthened competition.

In the securing of new products which will appeal to both our foreign and domestic markets we need an intensified research activity which will bring forth new articles of economic attractiveness.

The development of special farm equipment for small farms is an instance of intelligent foresight, but I warn that our foreign competitors watch every move and are quick to take advantage of any new idea which may be generated here but in respect to which we are slow to take action in a commercial way; hence we need a sales policy which will dictate a certain amount of secrecy up to the point when we are ready to shoot, and then an intensive sales effort which will reap the commercial and financial advantage to which our efforts should entitle us.

Cannot Remake Customers

Certain of our people who engage in trade in the foreign market need something in the way of a new attitude and to these people I would say, "When in Rome—do as the Romans do" and invariably remember that these foreign markets have existed in most instances for many years prior to the existence of a market on this side of the Atlantic, and these people are slow to assume American business customs, and in many cases, it is a waste of time to endeavor to Americanize your customer.

Russian business continues to hinge, first, upon a settlement of the debt issue, and second, upon credits. Recently a trial balloon was sent up to determine whether sentiment would be favorable to the flotation of a $200,000,000 soviet bond issue in this country, the proceeds to be used for paying private debts, removing the obstacle created in the Johnson law which forbids credits to debt defaulters.

Dangling before American manufacturers' eyes are quiet inquiries for steel pipe, a continuous sheet-strip mill, railroad equipment and machine tools. There now is no impediment to private trading with Russia, provided no down payments are required and 3 to 5-year credits—or longer—are extended.

Incidentally, a manufacturer of continuous mills has under consideration the construction of such a mill in England for shipment to Russia. Credits are more favorable in England. The profit would accrue to the American builder, but British labor would benefit.

Offer Russian Iron Here

In respect to pig iron, Russia appears to be trying to turn the tables. An eastern organization having a family connection with importers of Russian manganese is offering soviet pig iron for sale in the East. To Oct. 1 none had been imported, according to the iron and steel division in Washington.

Russian pig iron production this year is approaching the 10,000,000-ton mark. The iron being offered in the United States is understood to be practically free from sulphur and phosphorus. A fresh reserve of iron ore, analyzing free from sulphur and zinc and estimated to total 60,000,000 tons, was recently discovered near the Kuznetsk works.

Institute

WAREHOUSE extras on a number of special steel classifications have been eliminated by the American Iron and Steel institute. Classifications affected are high speed steel, high speed drill rods, tool steel, tool steel drill rods, autuomotive carbon die steel, drill steel and nitralloy.

These extras for store service on shipments from warehouse were 2c per pound from points on or east of the Mississippi river and 3c west of the Mississippi.

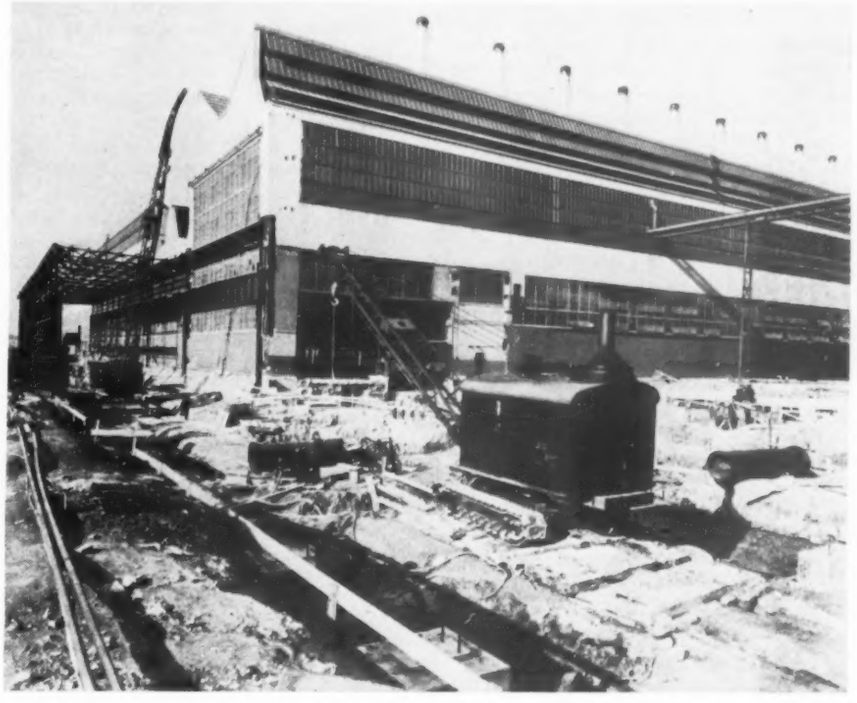
The trade reason for this action is that the materials are bought in too small quantities from the warehouses to make the extras worth while.

Meetings

INSTITUTE of Scrap Iron and Steel Inc. has been invited by the New York chapter to hold its 1935 annual convention in New York in the week of Jan. 14.

CHICAGO P. A.'S PLAN EXHIBIT

Chicago Purchasing Agents' association will hold a one-day exhibition of new products, packages and designs of its members and of advertisers of the *Chicago Purchaser* at the Stevens hotel, Nov. 15. A dinner meeting will be held that evening to be addressed by Don Clark, president, National Association of Purchasing Agents, and Dr. Glenn



HENRY FORD, STEELMAKER: On these foundations will rest the new 56-inch wide strip-sheet mill which the United Engineering & Foundry Co., Pittsburgh, is building for the Ford Motor Co. at Dearborn, Mich. About 500,000 tons of sheet and strip business will be lost to other makers, as a result. The Ford open-hearth building forms the background. Wide World photo

Frank, president, University of Wisconsin.

¶Iron and steel will be accorded a prominent position in a trade and industrial fair to be held in the Cleveland public auditorium Dec. 29 to Jan. 5, to demonstrate the progress of Cleveland and northern Ohio in the swing toward recovery. Exhibits of actual manufacturing processes will be featured. Housing will be given a prominent place. Headquarters are at 511 Terminal tower, Cleveland.

PAGEANT AT CONVENTION

Thirty-fifth annual convention of the International Acetylene association, scheduled for the William Penn hotel, Pittsburgh, Nov. 14-16, will include a dramatic presentation "Profits of Progress" as well as technical and business discussions. The annual dinner will be held Friday, Nov. 16. H. B. Pearson, of Compressed Industrial Gases Inc., Chicago, is president of the association.

Labor

GENERAL ELECTRIC CO. decided last week that the emergency which impelled it to adopt a temporary unemployment pension plan in June, 1930, has passed, and has reinstated its amended normal plan.

During the four years beginning June, 1930, employes and the company have contributed $5,500,000, and since $3,700,000 was disbursed for employe benefits the balance in the fund is $1,800,000.

The amended normal plan, effective Nov. 1, is based upon the company paying into the fund an amount equal to that paid by all employes, who will contribute 1 per cent of weekly or monthly earnings when such earnings are 50 per cent or more of the average full time rate, until payment has been made for 156 weeks.

Maximum weekly benefits under the new plan are $15 a week for ten weeks, plus loans up to $200 without security and interest, and relief grants of $100 in any year.

WARNS COLUMBIAN WORKS

National labor relations board Friday found the Columbian Iron Works, Chattanooga, Tenn., has violated section 7A of the recovery act by interfering with the right of employes to organize for collective bargaining and has warned that unless the company agrees with its union molders in five days the government will take action.

¶President Roosevelt's committee on economic security will confer with 200 citizens and social insurance experts in Washington Wednesday and Thursday, on a program to be submitted to the coming congress in regard to unemployment insurance and old age pensions. The senate finance committee is expected to hold hearings the end of November to formulate unemployment insurance legislation to be submitted at the next congress.

AGAIN DELAY JOB HEARING

Four times has the hearing been postponed which was to cover alleged charges made against Jones & Laughlin Steel Corp., Pittsburgh, by the Amalgamated Association of Iron, Steel and Tin Workers. The national steel labor relations board was to have heard this case in the federal courthouse, Pittsburgh, on Nov. 9, but last week the hearing was again postponed, to Nov. 16.

Other hearings scheduled by the labor board: Acme Steel Co., Nov. 13, and Illinois Steel Co. Gary works, Nov. 14, both at Chicago; Pittsburgh Steel Co. and Allegheny Steel Co., both at Pittsburgh, Nov. 15.

The Ideal Freight Car—It All But Solicits Own Load

ADDRESSING the Atlanta Freight bureau and other organizations at Atlanta, Ga., Nov. 6, Joseph B. Eastman, federal co-ordinator of railroads and member of the ICC, quoted Transportation Service Director Turney on what constitutes the ideal freight car. It is this:

The ideal freight car, not of the future, not of tomorrow, but of today, is one light enough to carry five times its weight; strong enough to drag one thousand times its weight; versatile enough to handle any commodity in any weather or temperature; insulated, coolable and heatable, adaptable in size to present-day sales unit requirements, providing security for person and property; dependably speedy in terminals as well as on the road; accessible for loading and unloading from any one of its six sides; and finally attaining both mobility and utility by being quickly and cheaply transferable from rail to highway chassis vertically, longitudinally and laterally.

Financial

REPUBLIC STEEL CORP. up to Nov. 2 had received 16,424 proxies in favor of the readjustment plan and the merger with the Corrigan, McKinney Steel Co., Cleveland. These proxies represent 48.9 per cent of the outstanding preferred stock and 60.7 per cent of the common. The merger and the readjustment plan are to be considered at a stockholders' meeting in Jersey City, N. J., Dec. 17.

Republic's loss for third quarter was $2,998,600, after charges. For nine months ended Sept. 30 net loss was $2,193,157 after charges, compared with $2,780,780 for the corresponding period of 1933.

ROLLING MILL LOSS $564,229

American Rolling Mill Co., Middletown, O., reports net loss of $564,229 in the third quarter, after charges, compared with profit of $1,472,880 in the second quarter and profit of $347,067 in the comparable quarter of 1933. For nine months the net profit was $1,453,919, against loss of $312,258 in the first nine months of 1933.

COLORADO IN BLACK FOR 1934

Colorado Fuel & Iron Co., Denver and Pueblo, Colo., reports loss of $446,836 in the third quarter of 1934, compared to loss of $752,812 in the third quarter of 1933. For the first nine months, the company showed a profit of $194,625 against loss of $2,307,273 in the first nine months of 1933.

FOLLANSBEE LOSS GROWS

Follansbee Bros. Co., Pittsburgh, encountered a loss of $116,423 in the quarter ended Sept. 30, compared to loss of $81,722 in the preceding quarter and loss of $128,707 in the September quarter of 1933. For the first nine months the loss was $399,852 contrasted to loss of $475,349 in the first nine months of 1933.

DECLARES DIVIDEND

Harbison-Walker Refractories Co., Pittsburgh, has declared a quarterly dividend of 12½ cents on the common stock, payable Dec. 1 to Nov. 15 record, and the regular $1.50 preferred stock payment for Jan. 21 to Jan. 7 record. Three months ago a common dividend of 25 cents was declared.

OTHER FINANCIAL REPORTS

Holland Furnace Co., Holland, Mich.: Third quarter, profit of $260,341; second quarter, loss of $112,375; third quarter 1933, profit of $207,782; six months ended Sept. 30, 1934, profit of $147,966; six months ended Sept. 30, 1933, profit of $142,701.

¶Pittsburgh Screw & Bolt Corp., Pittsburgh: Third quarter, profit of $7022; third quarter 1933, profit of $110,691; nine months 1934, profit of $335,892; nine months 1933, loss of $183,297.

¶Spang Chalfant & Co., Pittsburgh: Third quarter, loss of $39,923; second quarter, profit of $624,444; third quarter 1933, deficit of $109,649.

¶American Steel Foundries, Chicago; Third quarter, profit of $179,583; second quarter, profit of $452,845; third quarter 1933, loss of $223,869; first nine months, profit of $431,401; first nine months 1933, loss of $1,130,941.

¶National Supply Co. of Delaware, Pittsburgh: Third quarter, loss of

$121,113, second quarter, profit of $603,958; third quarter 1933, loss of $353,116; first nine months 1934, profit of $127,074; first nine months 1933, loss of $2,309,258.

¶Stewart-Warner Corp., Chicago: Third quarter, profit of $25,523, second quarter, profit of $372,765; third quarter 1933, loss of $14,065; nine months, profit of $565,782, nine months 1933, loss of $1,057,894.

CONSIDER DAVEY STEEL PLAN

W. H. Davey Steel Co., Cleveland, which a year ago acquired from the bondholders' protective committee of Empire Steel Corp. its plant at Cleveland, is receiving consideration of its plan of financing by the securities and exchange commission at Washington. The Cleveland plant has been in operation since Nov. 1, 1933. The plan provides an exchange of $150,000 principal amount of first mortgage 10-year 6 per cent sinking fund bonds and 2500 shares of capital stock for $270,000 principal amount of first mortgage 7 per cent gold bonds of the Empire Steel Corp. W. H. Davey is president, H. L. Berno vice president, and W. R. Jenkins secretary.

¶Westinghouse Air Brake Co., Wilmerding, Pa., reports net profit of $198,372 in the third quarter, compared with net of $313,757 in the second quarter and a net loss of $236,210 in the third quarter of 1933.

Transportation

PRESSED STEEL CAR CO., Pittsburgh, which STEEL announced (Nov. 5, p. 17) as having introduced a new light-weight hopper car weighing 30,000 pounds, exhibited the car on a special track adjoining the Waldorf-Astoria hotel, New York, Nov. 7 and 8.

Interested observers will have a chance to see the car on exhibit at Washington, Nov. 14 and 15, and at Chicago on Nov. 21 and 22.

Already railroad and steel circles are discussing this unusual car built of Cor-Ten steel made by subsidiaries of United States Steel Corp., as a possible coming design for the elimination of considerable dead weight in railroad rolling stock.

Morro Castle

SUMMARIZING testimony adduced at the investigation of the burning of the steamer MORRO CASTLE Sept. 8, Dickerson N. Hoover, assistant director of the bureau of investigation and steamboat inspection service of the department of commerce, recommends (1) extensive use of fire-resisting materials and (2) design of vessels to prevent rapid spread of fire, among other things.

No specific materials are cited as a means of accomplishing these ends, but in Washington they are regarded as offering an opportunity for steel. Not only should vessels be zoned by subdivision bulkheads of the hull and fire-screened bulkheads of the superstructure, but control of drafts, ventilating systems, stairways and elevator shafts are important, according to the report. It is recommended that furniture and drapes be made fire-resisting.

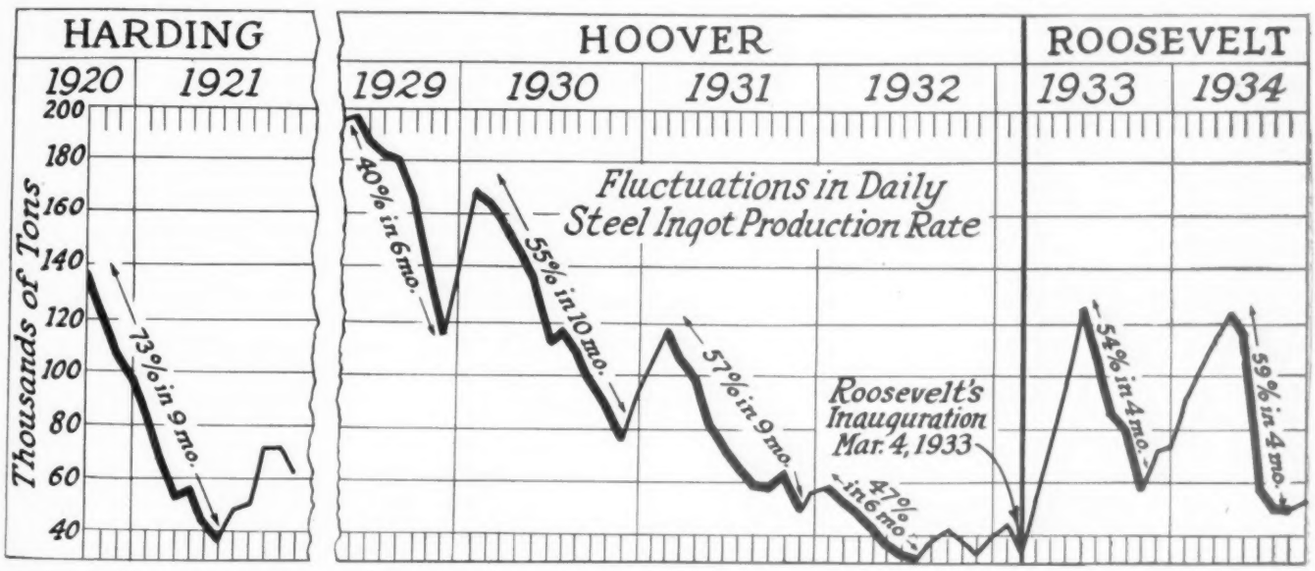
Housing

ADMINISTRATION advisers are considering a plan for merging the federal housing administration, Home Owners Loan Corp. and the slum clearance and subsistence divisions of the public works administration, to co-ordinate all new deal housing efforts in a single agency.

¶Last week the housing administration issued rules and regulations governing loans for construction of homes. Up to 80 per cent, or not to exceed $16,000 for a single project, will be insured by FHA. While it is expected that it will be spring before construction gets under way in any volume, FHA is prepared to act.

WANTS STEEL FRAMEWORK

John J. Earley, Washington inventor and builder of a number of



WHATEVER may be the reason, political or otherwise, the breaks in steel production under President Roosevelt and the new deal have been much more pronounced than in the earlier stages of the current depression and in the depression of 1920-21. From a daily rate of 124,174 gross tons last May, daily steel ingot production declined to 50,065 tons daily in September, this being a decrease of 74,109 tons daily, or 59 per cent in the short space of four months. For purposes of this calculation, it is assumed that the October ingot rate will show a slight gain over September. From July, 1933, to November of the same year the ingot rate, as compiled by the American Iron and Steel institute, declined from 126,734 tons daily to 58,507 tons, the shrinkage, also in four months, being 68,228 tons, or 54 per cent. As the above chart shows, one downward cycle during the Hoover regime represented a decline of 57 per cent over a period of nine months, another 55 per cent in ten months, a third 47 per cent in six months and a fourth 40 per cent in six months. During the Harding regime the ingot rate toppled 73 per cent in nine months. But in no four-month period during either the Harding or the Hoover depressions did the ingot rate fall so precipitately as during the Roosevelt depression. In both the Harding and the Hoover depressions the falls were broken by one month of rising output, but these were disregarded, making the comparison less favorable than otherwise. There is encouragement, however, in the fact that the general average of steel production has shown improvement since a year ago March, and short, choppy swings usually are a herald of improvement. October shows an upturn; will it prove to be the start of a belated fall rise?

reinforced concrete houses, called attention last week to the lack of suitable light steel sections which could be used for framework. Panels used by Mr. Earley are 2-inch reinforced concrete with a crushing strength of 6000 pounds to the square inch. Frames are needed, he maintained, only to make a place for insulation and to carry plaster and interior decoration. In the concrete houses built thus far by Mr. Earley, wood has been used as the framework.

NRA

UNITED STATES chamber of commerce Friday began taking a referendum vote among its members to ascertain the opinion of business on the operation of the national industrial recovery act. This is preliminary to submission of recommendations to congress in January.

TIGHTEN UP ON COMPLIANCE

William H. Davis, formerly national compliance director, will return to NRA to make a study of compliance and enforcement problems. Mr. Davis was appointed deputy administrator in August, 1933, and in November was made compliance director, serving until last June. His recall is construed as an indication that the recovery board is anxious to tighten up on compliance.

GRAY IRON CODE AMENDED

Amendments to the gray iron foundry code which was effective last Feb. 10, approved by the national industrial recovery board, incorporate standard clauses with respect to the filing, with a confidential and disinterested agent of the code authority, of identified lists of prices, discounts, rebates and other terms and conditions of sale; such filings to be permitted when 75 per cent of the tonnage of members of any agency or territorial division from a group in accordance with terms of the code; whenever a member of a group has filed a revision of price terms, such member shall not file a higher price within 48 hours.

¶Eldon R. Carl has been appointed to serve as an administration member of the code for the scrap iron, nonferrous scrap metals and waste materials trade, with Dr. N. I. Stone, and with headquarters at 25 Broadway, New York.

TRADE PRACTICE COMMITTEES

Scrap Iron and Steel Trade; M. V. Bonomo, Schiavone-Bonomo Corp., New York, chairman; Dan R. Cohen, D. R. & F. A. Cohen, Chicago; secretary; Joseph V. Kiley, T. J. Kiley & Son, Boston; Samuel Appel, Samuel Appel Co., Ft. Wayne, Ind.; Saul Brown, A. N. Brown & Sons Co., Pittsburgh.

Antifriction bearing industry: W. E. Umstattd, Timken Roller Bearing Co., Canton, O.; F. G. Hughes, New Departure Mfg. Co., Bristol, Conn.; A. C. Davis, Marlin-Rockwell Corp., Jamestown, N. Y.; E. R. Wakefield, secretary, code authority, New York; G. A. Strom, Strom Steel Ball Co., Cicero, Ill.; H. A. Schatz, Federal Bearing Co., Poughkeepsie, N. Y.; F. C. Burkholder, Ahlberg Bearing Co., Chicago.

¶NRA industrial board has approved an interpretation that the manufacture of aluminum wire and cable is subject to the code for the aluminum industry and not to the electrical manufacturing code.

Production

STEELMAKING production rose slightly to 27½ per cent last week, a gain of a half point. Slight improvement was noted in the Pittsburgh, Chicago and Youngstown districts. Gains were also noted in the Wheeling, New England and Cleveland districts, but these were largely offset by a loss of 11 points at Detroit. Automobile and farm buying are reported to be boosting operations, although no large tonnages have yet been released. Details for various districts follow:

Youngstown—Advanced 1 point last week to 31 per cent, but this rate is expected to dip to 29 per cent at the beginning of this week.

Chicago — Rose fractionally to slightly over 30 per cent last week. While recent gains are expected to be maintained over the coming several weeks, schedules are dependent to a certain extent on day-to-day business. Blast furnace operations are unchanged with eight of 36 steelworks stacks active.

Cleveland-Lorain — Increased 5 points to 43 per cent, with National Tube Co., Lorain, O., averaging seven open hearths for the week; Corrigan, McKinney Steel Co., eight and Otis Steel Co., two. As National Tube will have eight units on this week, the rate will advance at least three more points to 46.

Detroit — Down 11 points last week to 48 per cent, due to two open hearths being taken off. Nine open hearths were in operation, one producer scheduling five and another four.

Wheeling—Up 8 points to 39 per cent last week, highest rate in five months. Fifteen out of 39 open-hearth furnaces are operating, a net gain of three from a week ago. In spite of the fact that one of the smaller local interests has closed two open hearths, a larger producer has added four more open-hearth furnaces to his active list by reopening a down-river division which had been closed for over four months, and another mill here has placed one more open hearth in production.

Pittsburgh—Up 1 point to 20 per cent, due to slight gains mainly by independent steel mills in the district. The ingot rate of a leading interest here continues to depress the district's average.

For this week, and over the rest of the month, slight gains are expected, and some mills may be operating at 25 per cent by Dec. 1.

Fifteen out of 60 steelworks blast furnaces are active in this district. Pittsburgh Steel Co. and Pittsburgh Crucible Steel Co. are each operating 1 out of 2; Jones & Laughlin Steel Corp., 3 of 11; Carnegie Steel Co., 7 of 32; and National Tube Co., 1 of 4. Both of the American Steel & Wire Co.'s blast furnaces at Donora, Pa., are out, but Bethlehem Steel Co., at Johnstown, Pa., has 2 of 7 in blast.

New England—Gained 10 points to 40 per cent, one works putting on one open hearth, after having all units down for 10 days. The 40 per cent rate will hold this week.

Birmingham—Stationary at 25 per cent last week, with no change anticipated in the near future.

Buffalo—Held at 26 per cent last week, with ten open hearths in production. Operations this week are expected to slide back 2 points to 24 per cent, due to withdrawal of one unit. Nine furnaces continue in operation, and no immediate change is in sight.

Central eastern seaboard—Unchanged at 20½ per cent, although a modest increase is expected before the close of this month, due to the possibility of increased miscellaneous demand.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

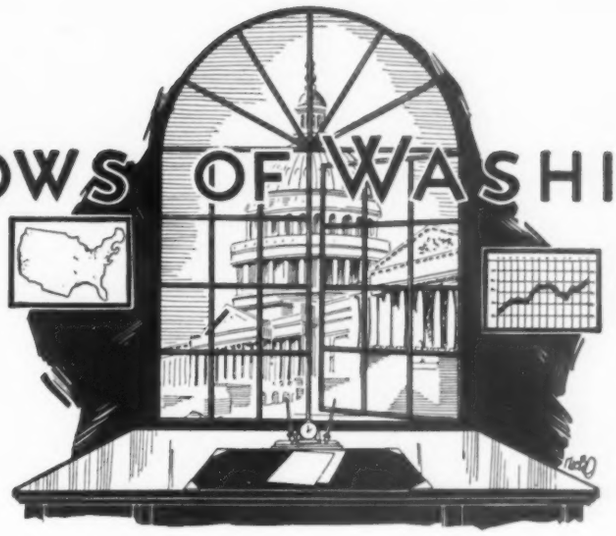
(Tons)

	1934	1933	1932	1931
Jan.	231,777	285,138	426,271	800,031
Feb.	385,500	275,929	413,001	762,522
March	588,209	256,793	388,579	907,251
April	643,009	335,321	395,091	878,558
May	745,063	455,302	338,202	764,178
June	985,337	603,937	324,746	653,104
July	369,938	701,322	272,448	593,900
Aug.	378,023	668,155	291,688	573,372
Sept.	370,306	575,161	316,019	486,928
Oct.	343,962	572,897	310,007	476,032
10 mo.	5,141,124	4,729,955	3,476,052	6,895,876
Nov.	.....	430,358	275,594	435,697
Dec.	.....	600,639	227,576	351,211
Yrl. adj.	.....	44,283	5,160	6,040
Total	.....	5,805,235	3,974,062	7,676,744

CORP. SHIPMENTS OFF LITTLE

Shipments of finished steel by the United States Steel Corp. in October were 343,962 tons, compared with 370,306 tons in September, a decline of 26,344 tons. For ten months of 1934 shipments were 5,141,124 tons, compared with 4,729,955 tons in ten months of 1933 (see table).

WINDOWS OF WASHINGTON



WASHINGTON

OVER the radio last Wednesday evening Secretary of Commerce Roper did for the administration the smartest job it has yet attempted for business.

The setting was this. Over the past two months the President has retired or repressed the chief irritants to business in Washington; he has welcomed industrial leaders to his councils; he has patently sought to reconcile industry; he has softened harsher phases of the new deal.

Naturally, this about-face was almost too good to be true. Critics and skeptics have been muttering, "wait until after election." They have referred to it as a deathbed repentance and revived the old saw about the longest fur concealing the sharpest claws.

On Tuesday came a landslide which, for a mid-term election, demolished all precedent. On Wednesday night, when the tidal wave was still lapping up the farthest shores of the republic, Secretary Roper, the cabinet member supposed to represent business and second only to Postmaster General Farley as the most consummate of the President's political advisers, went on the air.

PLANNED IN ADVANCE

Indicating that the President foresaw the sweep at the polls on Tuesday, Secretary Roper's time on the air was arranged prior to election, and the framework of his talk, at least, was in hand before election results were known.

Industry everywhere on Wednesday was wondering what next. Organized labor was tingling with fresh power. The secondary tier of new dealers, interpreting the landslide as a mandate, was preparing to extinguish the remnants of the old order in business. Plainly, the entire business community might easily be frozen by the prospect of a hell-raising congress.

Then came Secretary Roper with an address which even a tory, slightly chastened, could accept and which, barring a few minor discordant notes and claims of achievement, any industrial leader could applaud. It is an address worth writing to Secretary Roper at Washington for a complete copy.

FORWARD MARCH!

Stressing that no miracles were promised by the President and none is claimed, Secretary Roper launched out by maintaining that "everyone of my listeners will agree that the destructive forces of the depression have been halted. . . . Now that the elections are over and the newspapers are carrying final returns from the remote sections of the country, all of us can get down to the work and problems of the day and measure recovery in concrete terms without risking the danger of immediate pre-election political emphasis and prejudice. In the year ahead issues should not be obscured by the typical expediencies of pre-election periods. Now is certainly the time to stop talking so much about individual initiative and get down to work and, do something about it."

Shaking his fist at organized labor, Secretary Roper warned that "we must keep in mind the fact that citizens cannot properly demand rights unless they are willing to assume the responsibilities inherent in those rights. To illustrate, if we wish to exercise the right of not working, that is to strike, this right should be safeguarded; but in so doing we should defend the right not to strike, that is, the right to work without molestation. In the relationships which develop between employer and employe, it is mandatory upon both employers and employes to live up to their part of the agreements determined upon. Each must be just as responsible to the public and must be held to just as strict accountability as the other."

Reverting to business and smacking down the taunt of regimentation, Secretary Roper laid down this program for the next two years:

"First, we must orient and adjust our thinking and bases of judgment. We must examine the flood of generalized descriptive terms and labels which have grown up like mushrooms in recent months. Illustrative of this tendency is the use of the descriptive term of 'regimentation.'

"The all-inclusive application of labels and general descriptive terms instead of clarifying our thinking, usually confuses the true issues. . . . The program of the President is designed to control and battle against rather than to bring about regimentation. It is a program to save industry and business from the regimentation that develops through powerful minority control and incentives.

"This regimentation, to illustrate, took the form of forced and unwise superproduction in field and factory; the erection of tariff walls against other countries to the extent of prompting regimentation against our products to the destruction of our foreign trade; the regimentation of good business under antitrust laws so that willful business minorities were destroying our domestic trade and making it impossible for the majority of righteous business to establish and protect fair and ethical trade relations necessary for stable and just social conditions.

OTHER INEQUALITIES PRESENT

"This regimentation in many cases controlled scientific research and invention to the extent that the laborer and the less advantaged manufacturer and distributor were being rapidly eliminated from the fields of profitable business endeavor; it resulted in the needless industrial concentration of population in great centers to the destruction of rural life; and it also prompted the regimentation of an inequitable spread of the nation's taxation exemptions such as tax free bonds and an inadequate distribution of the purchasing power of the people.

"Certainly we are suffering from the effects of super-individualism against the development of the spir-

it of co-operation, a regimentation that encourages rather than controls selfishness and overlooks the larger and best values in life."

Emphasizing that the President has been operating along two lines of recovery procedure—emergency relief with recovery, and "reforms in the old order to safeguard against destructive economic and social catastrophies in the future"—Secretary Roper pointed to NRA as definitely limited to two years. He promised that the entire setup of NRA would be reviewed and the practical experience of business and government would be explored by the President and congress with the co-operation of industrial leaders — something large business groups have been advocating.

FOUNDATION FOR TAXATION

"I have little patience with those who attempt to split the American business system into two distinct divisions: one comprising so-called big business and the other little business," declared the secretary. "The two are definitely inter-related and inter-dependent and efforts to draw a distinct line of demarcation only serve to foster a false class division and create disharmony."

Reaching the high point of his address, Secretary Roper put his finger upon the motive which has prompted the President to draw closer to business recently. That motive is this: Relief expenditures cannot be met and a balanced budget achieved except through taxation, and taxation requires the foundation of satisfactory business, paying adequate wages to labor and dividends to stockholders. Said Secretary Roper on this point:

"I fully realize the disturbance that comes to the business man who asks himself the question as to where the money is to come from to meet the extra emergency needs for money under the recovery program. Associated with this question is another which is, 'Is business going to be so regimented that it cannot look for encouraging future rewards of profit in business?'

"The answer to these questions is found partly in our experience during and following the World war. Prior to the war, the federal budget was met in an important way through customs taxes, but with the enlarged expenses incident to all-consuming conflict, requiring four or five times the annual budget required before the World war, a new method of raising funds to meet the federal budget had to be devised. This took the form of an income tax.

"This income tax is based upon business profits. For the government to destroy this source of revenue would mean that it would have to reconstruct its entire fiscal program and certainly no such plan will be countenanced. Hence, it is that the government must encourage business profits in order that the government itself may survive and function. The increased indebtedness in this emergency period can be met gradually, as business gets on its feet, earns profits and divides the same equitably and justly with the government to balance its budget.

"This does not mean that business will be shouldered with excessive taxes for it is plainly evident that this would prevent the return of normal and prosperous conditions. Sound taxation is just as much a key to recovery as any other single factor and a planned program must seek to levy additional taxes, if found necessary, only to the extent that business can carry the increase without obstructing the processes of recovery."

Nor can one quarrel with the secretary's "snapper":

"Today actual business conditions are better than business sentiment. Now is the time to rely upon one great American asset that has been utilized too sparingly. With all of the plans and agencies just discussed under way, one thing yet remains—to dispel the gloom that has gripped and paralyzed many people through the long years of the depression. To accomplish this, my friends, what this country now needs is a good sense of humor."

Strong words, these, stronger than any uttered so far by the President or anyone high in the administration and coming close to stating fundamentals. Considering the rigid control exercised by the White House on spokesmen, the address is accepted as a statement of policy.

Certainly the two highlights of the address—the warning to organized labor and the acknowledgement that business must be permitted to earn profits—jibe with recent developments.

LABOR SEEN REBUKED

Privately, persons high in the administration have been saying that labor has overplayed its hand, and the extension of the automobile code to Feb. 1 with the merit clause unchanged, over the protest of labor, is a rebuke to it.

There appears to be no doubt that the President expected industry by this time to be so far along on the road to recovery, as a result of NRA and other expedients, that not only would relief expenditures be greatly reduced but stiffer taxes to foot the bill already incurred would also be possible. It was when business failed to develop a fall upturn that the President appeared to be swinging away from the left.

SO FAR as iron and steel is concerned, and for that matter all industry, last Tuesday's election does not alter the situation in Washington appreciably.

Accepting the Roper speech at face value, the trend will continue to be toward saner counsels. Certainly the return to NRA of such men as W. Averill Harriman, A. R. Glancy, W. L. Allen and E. R. Stettinius Jr., and the caliber of the new advisory board headed by S. Clay Williams is reassuring.

There will be no session of congress until January, under the new constitutional setup, and hence no legislative change next month. While Democratic control of the new congress is more complete, it is not as though industry faced a new political thought; for all practical purposes the larger Democratic majority does not change the picture.

It was just as patent before election as after that prospective legislation includes the 30-hour week, unemployment insurance and old-age or retirement pensions. There is a growing belief that congress will not be so wild as was feared some weeks ago. Even so, its control will be difficult for the President, and he may continue to solicit the support of industry as a prop.

MORE CAPITAL GOODS PROJECTS

Unquestionably, relief expenditures fully as heavy as last winter cannot be avoided, but the increasing recognition that only out of the profits of business, in the last analysis, can these expenditures be met is likely to temper the zeal of the relief experts.

In the new public works projects that are being shaped up, the durable or heavy goods will receive more attention. The emphasis will be more upon materials and equipment and less on common labor. Probably a new civil works administration will be a relatively heavier buyer of material than the original one last winter.

PWA Director Ickes is in process of being weaned away from waterworks and sewer projects—his hobbies—and is being "sold" on such undertakings as the elimination of grade crossings. All state highway departments have been asked by the bureau of public roads to submit grade crossing programs.

At the moment considerable inflammable material that might set off a conflagration of inflation is lying loose around Washington, but no one has yet dropped a match in it, and no one is likely to.

From the manner in which housing is being pushed, with a possible co-ordination of all housing, subsistence-homestead and slum-clearance activities, Washington still is betting that this will prove to be the most effective recovery stimulant thus far devised. Its full incidence, of course, will not be felt until spring.

The steel code seems likely to remain largely unchanged—though the "extra" situation still bothers and may be adjusted—for the duration of the recovery act, or until June 16. The automobile code, governing the largest single consumer of steel,

(*Please turn to Page* 24)

DETROIT

HAVING surmounted the code extension hurdle successfully, the automotive industry is entering the final stretch of its drive toward completion of work preliminary to new model assemblies, with indications that these preparatory activities will gather momentum as the year-end approaches.

In general, the industry will take initial 1935 models off the lines at a later date than was anticipated 60 days ago. There is a disposition to go along with the President's desire to level off the peaks of production, and in general it will be late December or early January before really good schedules are attained.

As a result, releases for parts are slow coming out, and a few have been held up. It looks as if Ford will be out about Dec. 1 with his new model, and will have a clear field until January, as he did this year.

This month now appears likely to line up with October and September in falling below production of comparable 1933 periods unless one or more of the major builders is able to step up operations sharply during late November, a development not looked for at this moment.

RUSH ORDERS FOR DIES

Signs of better activity last week were seen in the letting of additional die work and a further gain in steel orders. Chevrolet, late in putting its final O.K. on the 1935 design because of recent revisions in plans, placed some sizeable die business.

Part of this went outside Detroit, a Chicago firm receiving one large order. The necessity of rushing the work apparently accounts for the spreading of the business. Packard also has let considerable die work for its new small car, placing some of it locally and partly with Philadelphia and Ohio interests.

Gossip credits the new Ford with being the bogey man which caused late changes to be made in designs of its principal competitors, these revisions concerning the appearance of the cars principally. Changes are understood to have been effected not only by Chevrolet and Plymouth but also by some other members of the Chrysler family.

Dodge has been forced to delay the resumption of passenger car assemblies even though it is in one of the best positions in the industry so far as dealers' stocks are concerned.

The effect of these supposedly counter moves to meet Ford competition will be more substantial changes from current models than had been looked for a short time ago, and while bodies, fenders and radiators will show most of the results of the designers' efforts, mechanical and structural features will not lack for talking points.

Chevrolet, for example, is understood to have adopted a major change from its present type in frame design, while a slightly different style is seen for the new Ford frame as well. Increased streamlining is incorporated in Chevrolet fenders.

What Ford may offer in the way of an automobile is not the only worry of other companies. Unique in its circumstance that it has no army of stockholders to which it must give consideration, the Ford company can disregard immediate profits if it so chooses, and the rumor is current that its ideas on prices next year are down rather than up. If reductions develop it will go hard on competing companies which have seen sharply increased production this year turned into lower profits than in 1933 and which regard price advances rather than decreases the logical move for next year.

Several tendencies in design that have been adopted by one or more cars this year or last will gain new converts in the 1935 lineup. Among these features will be the wider body, offered by Chrysler and Hupmobile in the extreme streamlined models; horizontal hood louvres, used on most cars this year; the concealed tire, pioneered by Hudson and Terraplane; the narrow radiator, popularized by LaSalle; and the reverse sweeps at the rear of the car which give the impression of additional length.

GEARSHIFT LEVERS TO GO?

Overall height of bodies will be reduced as much as 2 inches, but seat widths and leg room will be increased. The move toward accommodating three passengers in the driver's seat is expected to hasten the elimination of the gear shift and brake levers from their customary positions either through use of a shiftless transmission such as employed by Reo or by dashboard mounting of conventional levers. Coil springs for independent front

Automobile Production

Passenger Cars and Trucks—U. S. Only

By Department of Commerce

	1932	1933	1934
January	119,344	130,087	156,907
February	117,418	106,888	231,707
March	118,959	118,002	331,263
April	148,326	180,713	354,745
May	184,295	218,347	331,641
June	183,106	253,387	308,051
July	109,143	229,357	266,575
August	90,325	232,855	234,809
September	84,150	191,800	168,872
October	48,702	134,683	120,000*

*Estimated.

Estimated by Cram's Reports

Week Ended	
Nov. 3	17,116
Nov. 10	15,920

wheel suspension, a 1934 innovation, may give way to the leaf type in some instances. One maker who is both secretive and sensitive, is reported to have dropped coil springs on two models for 1935, causing partsmakers and suppliers to rearrange their programs.

Manufacturers are accorded only a partial victory in the presidential extension of the code. The industry wanted a renewal until June, the nominal expiration date of NRA, but received only three months. Labor wanted a reopening of the code, 30-hour week, more pay and elimination of the merit clause but was forced to be satisfied with the promise of a presidential investigation between now and Feb. 1, from which may come certain changes in hours and wages after the latter date.

Producers take some comfort from the fact that they will be able to proceed uninterrupted for three months except for the disturbing thought that trouble possibilities merely have been postponed and may be encountered again when the industry is expanding its operations to meet spring buying.

SALES GENERALLY OFF

Retail sales recently have been declining despite price reductions and, like production, make an unfavorable comparison with conditions a year ago when buying was stimulated by the approaching adoption of the retail code with its restrictions on used car allowances. Whether the recent election had an appreciable effect in retarding car sales is questionable but insofar as it contributed some uncertainty to business in general, its passing removes that factor from the picture.

One exception to the decline in retail sales during October was Hudson and Terraplane, business in these cars being best for that month since 1929. Sales totaled over 5300 units, a gain of 33.9 per cent over September and 49.5 per cent more than a year ago. This active demand has permitted a continuation of assemblies recently, although dealers' stocks have been reduced substantially at the same time.

Hudson's exports for the first eight months totaled nearly 10,000 cars, a gain of 146 per cent over last year. Exports for the industry during the same period were 112,589 units, against 48,020 in 1933.

Oldsmobile makes no claims to exceeding its September volume, but its sales in October set a new high for that month when they topped October, 1928, by some 700 cars. Oldsmobile continues in fourth place, ranking only below the three lowest price cars.

Assemblies remained at a low level last week and with Chevrolet at the end of its 1934 run, another decrease is in prospect before new model production turns the curve upward. Chevrolet recently contributed 12,500 units of the total week's output of around 17,000 cars and trucks, so that shutdown of this company will bring assemblies to the year's ebb. Buick will increase its production this month over the approximately 2000 units built in October when assemblies were curtailed by a shutdown for inventory taking. Pierce-Arrow has resumed operations in order to build 200 cars authorized by the court. Production of Dodge commercial cars represented the only assemblies by Chrysler units last week. Pontiac and Oldsmobile lines remained down.

Murray Corp. of America has been compelled to rearrange its Detroit plants completely, because of greatly increased production schedules in prospect for 1935, due in part to the big Ford program.

Not only in bodies but also in demand for cushion springs and allied automotive parts, truck frames and steel beer barrels is Murray experiencing a decided pickup.

Two developments expected to improve the Murray situation next year are a method of welding smaller sheets for certain operations and a zigzag surface cushion spring. All piecework has been abolished in favor of day work by Murray.

White Motor, at Cleveland, has announced a 6-cylinder medium-heavy duty truck, with 5-speed transmission and 8-inch heat-treated channel frame, chrome-plated radiator, and fully enclosed fenders giving a streamline appearance.

Died:

ALGER R. WILLIARD, 46, assistant district manager of sales at Cleveland for the Carnegie Steel Co., in Cleveland, Nov. 3. Born in Jefferson, Md., Mr. Williard attended Georgetown university, in Washington. Entering the Washington office of the Carnegie company and other subsidiaries of the United States Steel Corp., he remained there two years before being transferred to the home office at Pittsburgh. For three years, while in the Carnegie office in Pittsburgh, he attended night school at the Carnegie Institute of Technology. He had been transferred to the Detroit office of the Carnegie company but a short time before the United States entered the World war in 1917. Leaving the army, he returned to the Pittsburgh office of Carnegie, but was shortly transferred to Cleveland, where he was assistant district sales manager for almost 15 years.

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Robert C. Williams, 53, for 14 years superintendent of the Brown-Lipe Gear Co., Syracuse, N. Y., in that city, Oct. 21.

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Matthew J. Kelly, a native of Hancock, Mich., and managing director of the Guelph Stove Co., Guelph, Ont., in the latter city, Nov. 2.

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Harry H. Shults, 46, engineer, technical adviser on building equipment and president of the Shults Engineering Co., Buffalo, in that city, Oct. 23.

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J. Willis Dalzell, 44, founder of the J. Willis Dalzell Co., Pittsburgh, building materials and maker of steel vault reinforcing, in Pittsburgh, Nov. 2. He was also president of the Lock-Steel Co., and the Hydrolithic Waterproofing Co., both of Pittsburgh.

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Earl G. Bott, 46, vice president, treasurer and general manager of the Blackhawk Mfg. Co., Milwaukee, Nov. 2, following a three-month illness. He was an official of the Automotive Jack institute and NRA group chairman of the wrench manufacturing industry.

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D. P. N. Little, 73, vice president of the A. M. Castle & Co., steel jobber, Los Angeles, at his home in Pasadena, Calif., Oct. 25. Moving to California from Marshfield, Mass., nearly 50 years ago, he was senior member of the steel firm of Little & Robinson until 1925, when the company was absorbed by the Castle interest.

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Franklin Schneider, retired president of the Van Dorn Electric Tool Co., Cleveland, at his winter home in Hollywood, Fla., Nov. 4. An able mechanic, he helped found the Van Dorn & Dutton Co. in 1898 and managed the latter until 1913, when he became president of the electric tool company. He sold out his interests in 1929.

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Samuel D. Shook, 77, well known in steel and engineering circles of the Pittsburgh district, in Pittsburgh, Nov. 1. He was an employe of Jones & Laughlin Steel Corp. for over 25 years and later was associated with C. A. Turner Co., Pittsburgh. He was a son of Jacob Shook, who years ago was chief engineer of power plants for Jones & Laughlin.

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August John Dinklage, 72, inventer and former manufacturer of railroad supplies, at his home in East Orange, N. J., Nov. 3, after a long illness. Born in Oldenburg, Germany, he came to this country as a young man and later perfected a unit anchor for rails. He organized the Creepcheck Co. of New York to manufacture this invention and other railroad supplies, serving as president until he retired in 1930.

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George W. Drake, for 40 years as-

(*Please turn to Page* 60)

Industrial Men in the Day's News

K. C. Gardner, Vice President in Charge of Sales, United Engineering & Foundry Co.

Since the early nineteen hundreds he has been associated closely with the steel industry.

Following a technical education he was employed by a leading builder of mill equipment.

He has been active in sales work in Pittsburgh since 1901, widely known in the rolling mill field.

K. C. GARDNER, who is now vice president in charge of sales for United Engineering & Foundry Co., Pittsburgh, as STEEL noted Oct. 29, is a prominent figure in the iron and steel industry, where he has made an enviable reputation for the past 30-odd years.

Born Aug. 5, 1876, in Cleveland, he received his education at University school and Case School of Applied Science, both in Cleveland. His first affiliation was with Wellman, Seaver, Morgan & Co., Cleveland, now the Wellman Engineering Co.

In 1899, he became associated with the Lloyd-Booth Co., Youngstown, O., as a salesman. When United Engineering & Foundry absorbed this company Mr. Gardner was transferred to the Pittsburgh office as machinery sales manager in 1901.

He was elected vice president of the company April 14, 1928, and when Charles E. Satler retired on Aug. 1, 1929, Mr. Gardner was appointed general manager of sales. His experience in the design and sale of rolling mill equipment has brought him many close associations throughout the steel industry.

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Charles H. Reinert, former superintendent of the Brooklyn, N. Y., plant of Steel & Tubes Inc., Cleveland, recently has been appointed assistant superintendent of the electric weld tube mill of the parent corporation, Republic Steel Corp., at Youngstown, O.

M. B. Steele, until recently sales engineer in the Cleveland office of Steel & Tubes, is now assisting E. T. Glass, sales manager of the New England division, with headquarters in Boston.

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Harold P. Banks, 26 John street, New York, has been appointed district sales representative for Frank Samuel & Co. Inc., Philadelphia.

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M. V. Druppool has been appointed district representative for the steel beer keg division of the Fedders Mfg. Co. Inc., Buffalo, with headquarters at 299 Madison avenue, New York.

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Walter A. Rowe is now associated with the general offices sales organization of American Sheet & Tin Plate Co., Pittsburgh. He recently resigned as advertising manager of the air conditioning department of General Electric Co.

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W. J. Fairbairn, secretary of the Milwaukee branch, National Metal Trades association, is resigning this position which he has held for the past 32 years. At one time he was manager of the Western Malleable & Grey Iron Mfg. Co., Milwaukee. He will be succeeded in the association by A. R. Peirce, director of the organization's industrial education department.

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Harry D. Fenske has been appointed a member of the commission for the port of Detroit to fill the unexpired term of George R. Fink, resigned. Mr. Fenske is manager of the transportation and export department of the Great Lakes Steel Corp., Detroit, subsidiary of the National Steel Corp., of which Mr. Fink is president, and has been serving as secretary of the commission known as the port of Detroit authority since its formation in January. The commission has jurisdiction over transportation and waterfront facilities in Wayne county.

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Arthur E. Murton has been placed in charge of roll manufacture at the Lima, O., and Springfield, O., plants of the Ohio Steel Foundry Co., Lima. He recently resigned as superintendent of the roll foundry of the Hubbard division of Continental Roll & Steel Foundry Co., East Chicago, Ind. The Ohio company has installed equipment to produce chilled iron and alloy iron rolls, in addition to steel rolls.

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Robert J. Working has been appointed district sales manager in Cincinnati for Republic Steel Corp., Youngstown, O., succeeding W. A. Peck. Formerly in the sales department of United Alloy Steel Corp. at Canton, O., Mr. Working was placed in charge of the Cincinnati district

Warner A. Peck

office of Central Alloy Steel Corp. in 1927. Following the Republic merger in 1930, he was made assistant district sales manager of this office.

Mr. Peck for two years was in the sales office of the Trumbull Steel Co. at New York, for nine years was district sales manager of that company in the Cleveland office, and for the last seven years has been district manager at Cincinnati. His future plans are undecided.

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George Batty, technical director of Steel Castings Development bureau,

Pittsburgh, since its inception in 1928, has resigned and is now associated with the Crucible Steel Casting Co., Lansdowne, Pa., as technical director in charge of production and metallurgical development.

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Wallace H. Rowe Jr., a director of Pittsburgh Steel Co., Pittsburgh, has been made a member of the executive committee.

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G. G. Coolidge, assistant to the president of Harbison-Walker Refractories Co., Pittsburgh, has been elected vice president and a director of the company.

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F. L. Ingraham, president, Marquette Railway Supply Co., Chicago, has been appointed Chicago district representative of the Union Spring & Mfg. Co., New Kensington, Pa.

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George P. MacKnight has resigned as secretary of the Porcelain Enamel institute, Chicago, effective Nov. 1, to become regional director of the Book Manufacturers' institute in that city. No successor has been named by the enamel institute.

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Robert L. Nutt Jr. recently was appointed sales representative in the southeastern district for the American Bolt & Nut Fastener Co., Pittsburgh, with headquarters in the National Bank of Commerce building, Norfolk, Va.

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Norman F. Tisdale recently has become associated with the Molybdenum Corp. of America, Grant building, Pittsburgh. He formerly was connected with the Republic Steel Corp. at Buffalo and more recently with the Titanium Alloy Mfg. Co. in the latter city.

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Edward Sand, veteran employe of Cincinnati Milling Machine Co., Cincinnati, recently was presented with a gold watch in recognition of 50 consecutive years' service. The occasion was a dinner at which 53 other employes, all with the company 25 years or more, were present.

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Clyde M. Brading, for many years head of safety and industrial relations at the Wisconsin Steel Works, South Chicago, Ill., a division of the International Harvester Co., was tendered a farewell dinner by 300 employes of the company upon his recent retirement. He was presented with an outboard-motor boat.

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H. F. Hackedorn Jr., for the past 15 years active in the sale of building products to the steel industry, has been appointed vice president and sales manager of the Lubrication Products Co., Burgettstown, Pa., an outgrowth of the reorganization of the company formerly known as the Journal Lubricator Co. The new company, with general offices in Cleveland, has taken over patent rights for the positive journal lubricator known as Stapax.

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Frank C. Jones, president, Okonite Co., New York, was elected president of the National Electrical Manufacturers' association at its recent annual convention at Chicago. Vice presidents elected include: F. R. Fishback, Cleveland; Carl S. Pierce Jr., Pittsburgh; S. L. Nicholson, New York; O. E. Shreve, Schenectady, N. Y., and D. G. Phelps, Hartford, Conn.

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Paul H. Shaeffer has been appointed assistant general manager of sales of the Ohio Ferro-Alloys Corp., Canton, O. He has been identified with progress and development in the alloy steel industry, and has had many years of practical steelmaking experience, primarily through association with the Central Steel Co., Massillon, O., and United Alloy Steel Corp., Canton, now units of Republic Steel Corp.

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L. V. Collings has resigned as secretary of the American Iron and Steel institute, New York, to become associated with the legal department of Standard-Vacuum Oil Co., New York, producer and marketer of petroleum products in the Orient. Associated with the Institute since January, he formerly practiced corporation law in New York and for a period of years previously was connected with the Standard Oil Co. of New York, stationed in China. Appointment of his successor will be considered at the next meeting of institute directors, Nov. 15.

Walter S. Tower continues executive secretary of the Institute.

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John Howe Hall, Taylor Wharton Iron & Steel Co., High Bridge, N. J.; Enrique Touceda, Malleable Iron Research Institute, Cleveland; E. V. Ronceray, internationally known French foundryman; Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland; Ralph S. McPherran, Allis-Chalmers Mfg. Co., Milwaukee; and H. W. Gillett, Battelle Memorial institute, Columbus, O., all former medalists of the American Foundrymen's association, have been elected to honorary life memberships in the association, as has Arnold Lenz, assistant manuacturing manager, Chevrolet Motor Co., Flint, Mich., 1934 Whiting medalist of the association.

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Dr. Vsevolod N. Krivobok, who has been professor of metallurgy at the Carnegie Institute of Technology, Pittsburgh, has become associated with the research department of the Allegheny Steel Co., Brackenridge, Pa., and will divide his time equally hereafter between these two institutions. As a member of the Carnegie Institute staff for the past ten years, Dr. Krivobok has investigated many metallurgical problems, particularly pertaining to stainless steel. Because of his studies in special metals, he was invited to give the annual Campbell memorial lecture at the National Metal congress in New York in October (STEEL, Oct. 8, p. 41).

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Roscoe Seybold, comptroller of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and associated with the company since 1908, has been named a vice president. Previous to being comptroller he was assistant to the vice president and general manager, continuing as assistant when the latter was made president in 1929.

William G. Marshall, since 1929 assistant to vice president in charge of industrial relations of Westinghouse, also has been named a vice president.

Ralph Kelly, for a number of years Westinghouse director of budgets, is a third recently named vice president.

F. R. Kohnstamm has been appointed manager of the lighting division of Westinghouse at Cleveland, to have supervision over all lighting activities including sales, engineering and manufacturing at the Cleveland works. He has been associated with Westinghouse since 1917, and until recently was sales promotion manager at East Pittsburgh, Pa.

Convention Calendar

Nov. 14-16—International Acetylene association. Thirty-fifth annual convention at William Penn hotel, Pittsburgh. H. F. Reinhard, 30 East Forty-second street, New York, is secretary.

Dec. 3-7—American Society of Mechanical Engineers. Fifty-fifth annual meeting at Engineering Societies building, New York. P. T. Wetter, 29 West Thirty-ninth street, New York, is assistant secretary.

Dec. 3-8—Eleventh National Exposition of Power and Mechanical Engineering. Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, is manager.

Windows of Washington

(*Concluded from Page 20*)

is unchanged to Feb. 1, but in view of the plan to level off the peaks and fill in the valleys some tonnage that would normally accrue to steel this quarter may carry over until 1935.

When Myron C. Taylor took some of the sting out of the United States Steel Corp.'s third quarter deficit of almost $10,000,000 by forecasting "gradual continued improvement" in steel he summed up Washington's view. A slow but steady gain in operations until the holidays, a sharp dip and then a brisk march toward a peak in the second quarter surpassing the tops of 1933 and 1934—that is what Washington foresees.

Here and There In Industry

INTERNATIONAL NICKEL CO., 67 Wall street, New York, has moved the district office of its development and research department into larger quarters in the General Motors building, Detroit. The office was established in 1929 to serve the automotive, aeronautical, machine tool and agricultural machinery manufacturers in Michigan, Ohio, Illinois, Indiana and Wisconsin. More space was made necessary by increased activity among durable goods manufacturers in the middle west. E. J. Hergenroether is district representative.

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Pennsylvania-Conley Tank Car Co., Koppers building, Pittsburgh, has purchased the assets of the defunct Oil City Tank Car Co., Oil City, Pa.

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Steel Industries Engineering Corp., Pittsburgh, is building an American electric rotary clay gun for the Hanna Furnace Corp., division of Great Lakes Steel Corp., Detroit. This is the second installation at that works.

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Columbia Steel Co., San Francisco, a subsidiary of the United States Steel Corp., is now manufacturing "seal of quality" galvanized sheets, in accordance with the standard of the American Zinc Institute Inc., New York.

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Champion Rivet Co., Cleveland, has appointed the Chicago Steel-Service Co., 3912 South Ashland avenue, Chicago, exclusive distributor for its welding rods in the Chicago district. Complete stock will be carried.

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Machinery & Welder Corp., 312 North Sheldon street, Chicago, has opened a branch office at 2118 West National avenue, Milwaukee, in charge of Roy C. Kendall. Complete stock will be maintained and service provided.

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Perfex Radiator Co., Milwaukee, manufacturer of radiators, has taken over the Central Radio Corp., Beloit, Wis. A new company, Perfex Controls Co., has been organized to conduct the radio and electric parts business, as a wholly-owned subsidiary of the Perfex Radiator Co.

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Gisholt Machine Co., Madison, Wis., manufacturer of machine tools, has reopened after two weeks shutdown, recalling 140 workmen, making a total of 200 now employed. Expectations are that production will be continued steadily.

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Hyatt Roller Bearing Co., Newark, N. J., has been given an order by Edward G. Budd Mfg. Co., Philadelphia, for journal bearings and boxes for the Boston & Maine's new streamline, diesel-motored articulated train. Motors are being built by the Winton Engine division of General Motors Corp. at Cleveland. The train will make a run of 700 miles daily between Boston, Portland and Bangor, Me.

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Link-Belt Co., Chicago, has purchased the physical assets of the Bailey-Burruss Mfg. Co., Atlanta, Ga. All divisions of the Link-Belt Co.'s Atlanta sales office are being moved to the Bailey-Burruss plant, 1116 Murphy avenue, which is to be known as the Atlanta plant of Link-Belt.

The new combined operations will be headed by Mr. I. H. Barbee, a Link-Belt engineer of long experience, who is being transferred from the Philadelphia plant of the company. Mr. Barbee was formerly the manager of the Link-Belt office in Atlanta. R. L. Lowder and J. R. Martin, of the Link-Belt Atlanta office, will continue as a part of the new Atlanta organization, as will J. O. Bailey of the Bailey-Burruss company.

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Electro Lift Inc., 30 Church street, New York, manufacturer of monorail electric hoists and cranes, has moved its plant to Bloomfield, N. J., where larger facilities are available for the manufacture of electric hoists and also for fabrication of hand and electric bridge cranes, jib cranes and similar work. The location in the New York metropolitan area allows quick delivery by truck to all points around New York as well as rail shipments to more distant points.

Steel Ingot Rate Rises in October

PRODUCTION of steel ingots in October showed a gain over September, following a continuous decline each month from the high point of the year in May. Daily rate of production in October was 54,146 gross tons, compared with 50,065 gross tons in September, an increase of 4081 tons daily, a shade over 8 per cent, according to figures compiled by the American Iron and Steel institute.

Total production for ten months of 1934 is 21,730,394 gross tons, compared with 19,274,284 gross tons in ten months of 1933. This is an increase of 2,456,110 tons, or about 12 per cent for the period.

Per cent of operation in October was 24.59, compared with 22.74 in September and with 36.89 in October, 1933. The average rate of operation for ten months in 1934 was 37.96, compared with 34.23 in the corresponding period of 1933.

Steel Ingot Production—1933-34—97.82 Per Cent of the Industry Reporting

Gross Tons

1933	Open-Hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approx. daily output all companies	Per cent operation
Jan.	885,663	109,000	994,663	1,016,870	26	39,110	17.99
Feb.	992,798	126,781	1,049,579	1,073,012	24	44,709	20.57
Mar.	784,111	94,509	878,620	898,236	27	33,268	15.30
Apr.	1,180,823	135,217	1,316,040	1,345,422	25	53,817	24.76
May	1,176,425	216,841	1,933,266	1,976,428	27	73,201	33.68
June	2,211,652	296,765	2,508,417	2,564,420	26	98,632	45.37
July	2,743,326	355,836	3,099,162	3,168,354	25	126,734	58.30
Aug.	2,430,663	370,370	2,801,033	2,863,569	27	106,058	48.79
Sept.	1,991,204	242,014	2,233,218	2,283,079	26	87,811	40.40
Oct.	1,847,690	191,673	2,039,363	2,084,894	26	80,188	36.89
10 mo.	16,714,355	2,139,006	18,853,361	19,274,284	259	74,418	34.23
Nov.	1,331,029	156,939	1,487,968	1,521,189	26	58,507	26.92
Dec.	1,629,495	129,834	1,759,329	1,798,606	25	71,944	33.19
Total	19,674,879	2,425,779	22,100,658	22,594,079	310	72,884	33.53

1934

99.39 Per Cent of the Industry Reporting

Jan.	1,786,467	172,489	1,958,956	1,970,979	27	72,999	33.15
Feb.	1,993,638	175,873	2,169,511	2,182,826	24	90,951	41.31
Mar.	2,540,143	203,904	2,744,047	2,760,888	27	102,255	46.44
Apr.	2,622,372	257,482	2,879,854	2,897,529	25	115,901	52.64
May	3,000,624	331,620	3,332,244	3,352,695	27	124,174	56.39
June	2,714,983	282,592	2,997,575	3,015,972	26	115,999	52.68
July	1,343,732	119,869	1,463,601	1,472,584	25	58,903	26.75
Aug.	1,245,445	109,598	1,355,043	1,363,359	27	50,495	22.93
Sept.	1,126,415	117,580	1,243,995	1,251,630	25	50,065	22.74
Oct.	1,325,225	127,789	1,453,014	1,461,932	27	54,146	24.59
10 mo.	19,699,044	1,898,796	21,597,840	21,730,394	260	83,578	37.96

Crucible and electric ingots not included. Percentages of operation for 1933 based on ingot capacity of 67,386,130 tons as of Dec. 31, 1932. Percentages for 1934 based on ingot capacity of 68,478,813 tons as of Dec. 31, 1933.

EDITORIAL

Don't Worry! The Hero Will Come to the Rescue

RUGGED individualism—a personal characteristic abhorrent to all new dealers—was a dominating factor in the grotesque outcome of many of the contests in the amazing off-year elections of last Tuesday.

To make this point clear it is necessary to go back to the beginning of the new deal. It will be recalled that Roosevelt, the candidate, won the presidential election on a conservative platform. In the campaign he pledged himself to a program of economy, stable money, etc. Elected, he promptly embraced the ideas of a heterogeneous collection of theorists and radicals, and as quickly renounced his pledges.

Notwithstanding the fact that in the 20 months he has been in office, many of his policies have proved to be not only impractical, but actually harmful to recovery, his administration has been hailed as a tremendous success—politically. This accomplishment has attracted the attention of political timber throughout the nation. Everywhere potential mayors, governors, congressmen and senators have stood in awe and gazed in envy at the unprecedented political triumph of Franklin D. Roosevelt and his brain trusters.

Candidates, Individualists in Politics, Set Out To Outdo New Deal in Radicalism

But here that despicable villain—rugged individualism—displayed his cunning hand. These politicians-in-the-making could not stand by complacently according to the doctrine of collectivism. No new deal equality could quench the fire of their individualism! On the contrary, they would undertake to outdo the new deal in radicalism. "If the public likes F. D. R.'s pink experiments," they reasoned, "we'll go him one better. We'll dish up a program that will make the new dealers look like stand-patters."

Thus rugged individualism played its malevolent role. It induced Upton Sinclair to blossom forth with his EPIC program—a plan so entrancing that straightway hoboes and ne'er-do-wells from 47 states hit the rods for California. It cajoled the buffoon Long into trying to outdo the new dealers. He put on a splendid show, which culminated Tuesday in the passage of state amendments which introduce to suffering Louisianians a soak-the-rich tax.

In neighboring Mississippi, the ambitious Bilbo could not bear the spectacle of the success of the new dealers and the hero of Sands Point. Impelled by the spirit of rugged individualism, he must excel them. With rare courage, born of desperation, (and with woeful lack of originality) he came out on the remarkable platform: "I'll raise more hell than Huey Long."

Meanwhile, in West Virginia a smart youth, aged 29, had been bitten by the bug of rugged individualism. "No new dealer can outsmart me," he vowed. Whereupon, he campaigned for senator, using for ammunition the declaration that he is more radical than President Roosevelt.

Olson, Bored by Feeble Gestures of Competitors, Issues Real Red Program

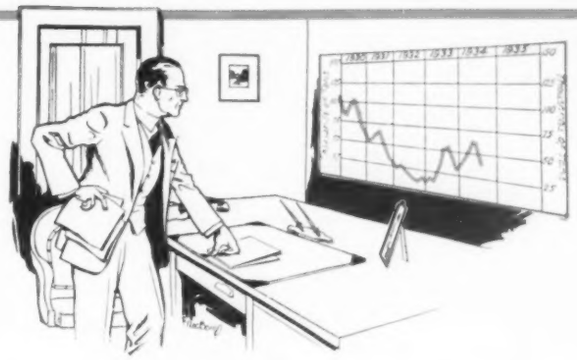
To Farmer-Laborite Olson in Minnesota, these several displays of radicalism became an acute pain in the neck. He, too, while strongly for collectivism for the other fellow, at heart is a rugged individualist. "These brain trusters—Tugwell, Frankfurter, etc.—and these imitators—Sinclair, Long, Bilbo, Holt, etc.; they are pikers. I'll give my people a real radical program." Quickly he issued a 16-plank platform, providing for "public ownership of mines, water power, transportation, factories and all public utilities"; state ownership of insurance; and demand for payment of the soldiers' bonus, repeal of the national economy act, etc.

But this was not all. The blood of individualistic ancestors, coursing in the veins of thousands of candidates for minor office, impelled each to attempt to outdo the other in the extravagance of their campaign promises. No one will ever know how many aspirants for office campaigned largely upon the claim that their election would insure a continuation of the flow of federal funds to their constituents.

Last Tuesday brought the harvest of rugged individualism in politics. Many, but fortunately not all, of those who attempted to go beyond the new deal were elected. The President is said to be sincerely alarmed at the implications of the outcome. Foreseeing it in advance, for weeks he has been preparing the stage for the climax of this stirring melodrama. At the proper moment, he, the intrepid hero, will rush in boldly from the wings to save industry and finance from the clutches of the radicals. Or, should we say, from the clutches of rugged individualism in politics?

To those who represent industry—poor, discredited, ruggedly individualistic, capitalistic, money changing Tories that they are—is left the doubtful right of smiling discreetly at the note of incongruity which pervades the scene.

THE BUSINESS TREND



Business Weighs Implications Of Election Results

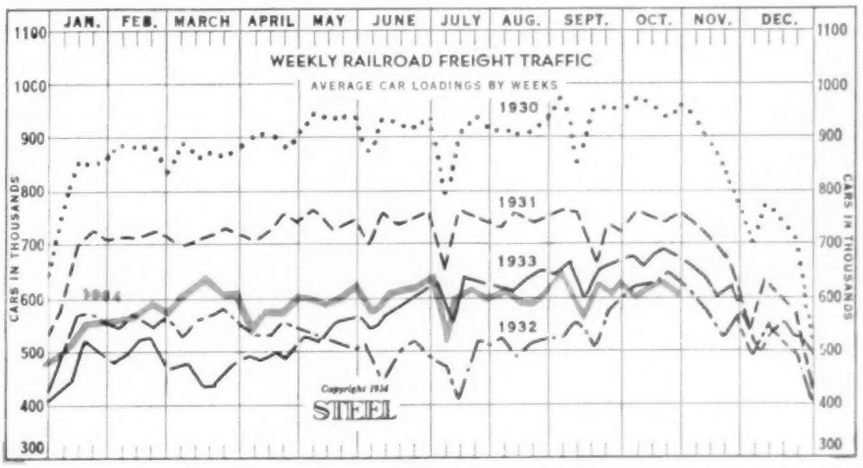
NO MARKED change in the trend of business was discernible during the week of the off-year elections. The several weekly barometers fluctuated within moderate limits, with no sharply defined tendency upward or downward.

The rate of steelworks operations again was higher, thus extending the present cycle of improvement which was reflected in the monthly figures for pig iron and steel ingot production in October. Output of electric power for the week ending Nov. 3 was 1,669,217,000 kilowatt-hours, a slight drop from the preceding week, but 5.4 per cent ahead of the output for the corresponding week of 1933. The spread in relation to last year's figure is the largest recorded since the week ending June 15, 1934. Preliminary reports on revenue car loadings for the week ending Nov. 3 indicate no marked deviation from the 624,200 cars of the previous week.

Several weeks will elapse before business can appraise the effect of last Tuesday's vote intelligently. At first glance, it would seem that the radical complexion of the next congress had been discounted in advance by many industrial executives. However, the election brought home to management in many sections of the country the sobering fact that cracked-brained extremists, who were victorious in certain states and municipalities, now have clear cut mandates from the public to carry out their campaign pledges. In Minnesota, one of these pledges was to take over factories. St. Paul's citizens voted to refuse gas, steam and electric franchises to a private public utility concern. Several cities, including Memphis, Tenn., voted to build municipal electric plants. Louisiana voted constitutional changes providing for "soak-the-rich" taxes.

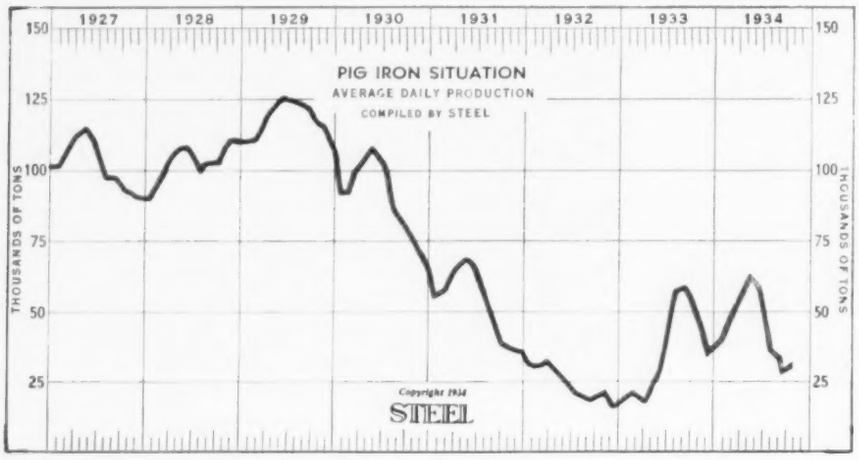
Industry Confronts Problem in Combating Anti-Business Tactics of Local Government

Industry's problem of dealing with these aggravating local situations may in some cases prove exceedingly difficult. In towns where the voters elected poorly qualified officials and at the same time imposed limits on taxes or voted down bond issues, inability to carry on the functions of local government will quickly present serious problems. Industrial management will do well to watch closely the local implications of the recent election.



1934
Oct. 27....624,252
Oct. 20....640,280
Oct. 13....635,639
Oct. 6....631,318
Sept. 29..644,647

1933
Oct. 28....642,423
Oct. 21....657,005
Oct. 14....670,680
Oct. 7....662,373
Sept. 30..669,186



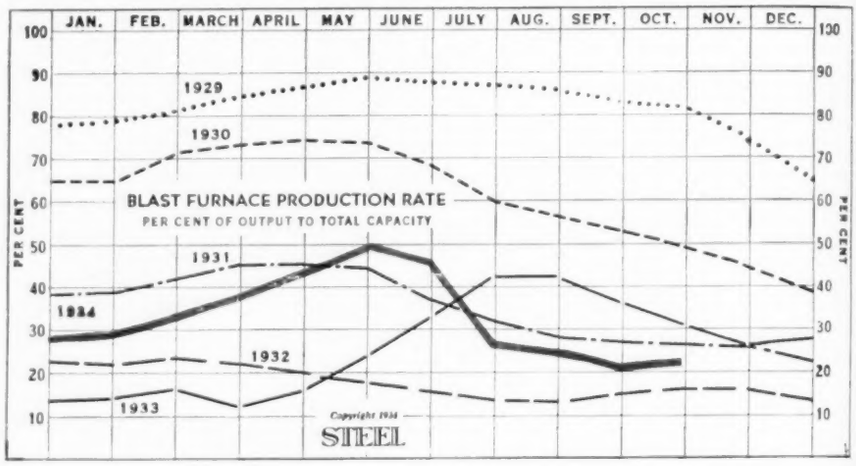
	Tons
October, 1934	30,695
Setember, 1934	29,969
October, 1933	43,824

October Iron Production Makes Slight Gain

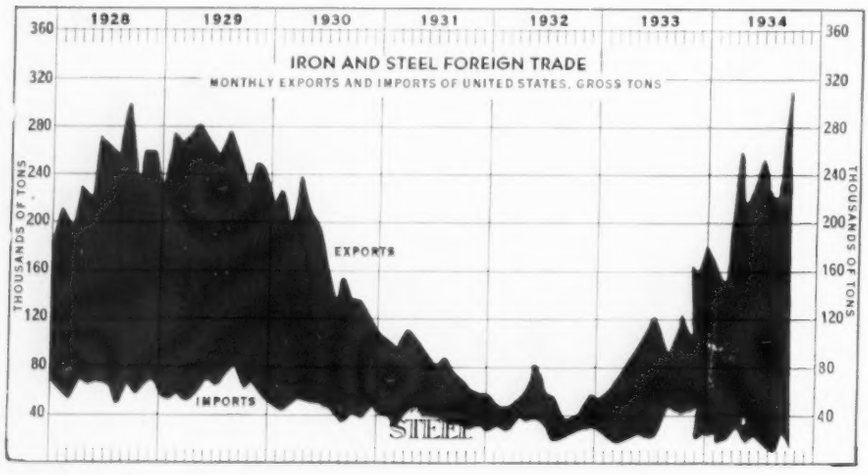
Average daily output of coke pig iron in October was 30,695 gross tons, which, compared with the 29,969-ton rate of September, was an increase of 726 tons per day. The production in August was 34,199 tons, while in October, one year ago, the daily rate stood at 43,824 tons. Pig iron made in the United States in 10 months has aggregated 13,991,954 gross tons, an increase of 3,046,123 tons, or 27.8 per cent, over the same period of 1933.

Blast Furnace Activity Up Moderately in October

With total pig iron production registering a small gain in October, 4 blast furnaces were added to the active list, making a total of 65 operating on Oct. 31. Relating production to capacity, the rate of output for October was 22.1 per cent. This compares with 21.5 per cent in September, 24.5 per cent in August, 28.4 per cent in July, 46.3 per cent in June and 47.5 per cent in May, the latter being the high point for the year. The operating rate for October, one year ago, was 31.8 per cent.



October, 1934	22.1
September, 1934	21.5
October, 1933	31.8



Exports		Imports	
September, 1934	301,330	September, 1934	23,847
August, 1934	242,947	August, 1934	32,418
September, 1933	108,799	September, 1933	55,706

September Steel Exports Highest on Record

Exports of iron and steel products in September totaled 301,330 gross tons, a gain of 58,383 tons or 44 per cent over shipments of 242,947 tons in August. This is the highest monthly total since the iron and steel division of the department of commerce was established in 1921. Scrap shipments in September reached the unprecedented total of 225,212 tons, a gain of 69,670 tons over the previous month. Imports in September were 23,847 gross tons, a decline of 26.4 per cent from August.

BRAZING WITH SILVER SOLDERS

BY ROBERT H. LEACH
Handy & Harman

Fig. 1—Brazing end plates to copper bellows for use in regulator valves, using low-temperature brazing alloy

ALTHOUGH it is possible to produce silver alloys which melt at temperatures below 1000 degrees Fahr. the term "silver solder" is usually applied to brazing alloys which require a red heat to melt them. Silver can be alloyed with copper, zinc, tin and cadmium or combinations of these metals in widely varying proportions to produce malleable and ductile alloys having a melting range considerably below the temperatures required for the use of base metal brazing solders, such as brass and spelter solders, nickel-silver solders and other alloys generally classed as bronze welding rods. Nickel and manganese can also be used in certain proportions with silver and other base metals and the melting points will be within the range of silver solders in common use.

It is evident, therefore, that an infinitely large number of binary, ternary or quaternary alloys can be made which would have melting points sufficiently low to allow their use for brazing purposes and it would be of great assistance to engineers responsible for specification of materials if it could be determined that a relatively few compositions would meet ordinary industrial requirements efficiently.

Silver solders containing varying percentages of silver, copper, zinc and in some cases tin and cadmium, have been used for many years. Many of the old solder formulas specified definite proportions of silver and brass. The use of different grades of brass resulted in a large number of alloys, many of which only varied slightly in actual percentage of the various metals, but at the same time if a certain composition had been used by a company for several years, and had been found satisfactory, there was some hesitancy in making any change even although it might involve only a difference of 1 or 2 per cent in the copper or zinc content.

As silver solders were being extensively used in different industries the American Society for Testing Materials undertook the investigation of silver solders with a view of establishing, if possible, a limited number of standard compositions which would meet the ordinary requirements. A committee was appointed in 1926 and tentative standards covering eight grades of silver solders were issued in 1928 and adopted in amended form as standard in 1929. These specifications are given the A. S. T. M. designation B73-29 and the percentage of silver runs from 10 per cent in the lowest grade to 80

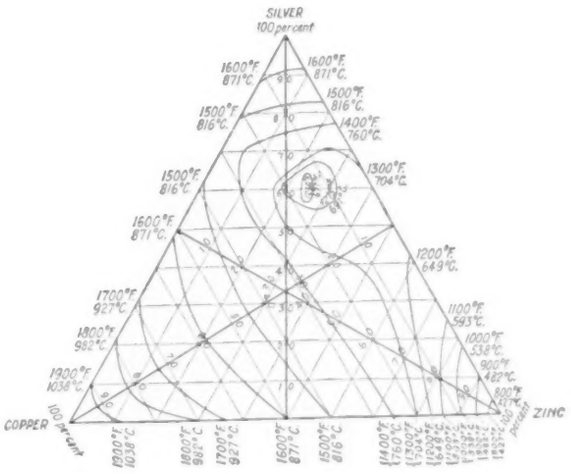
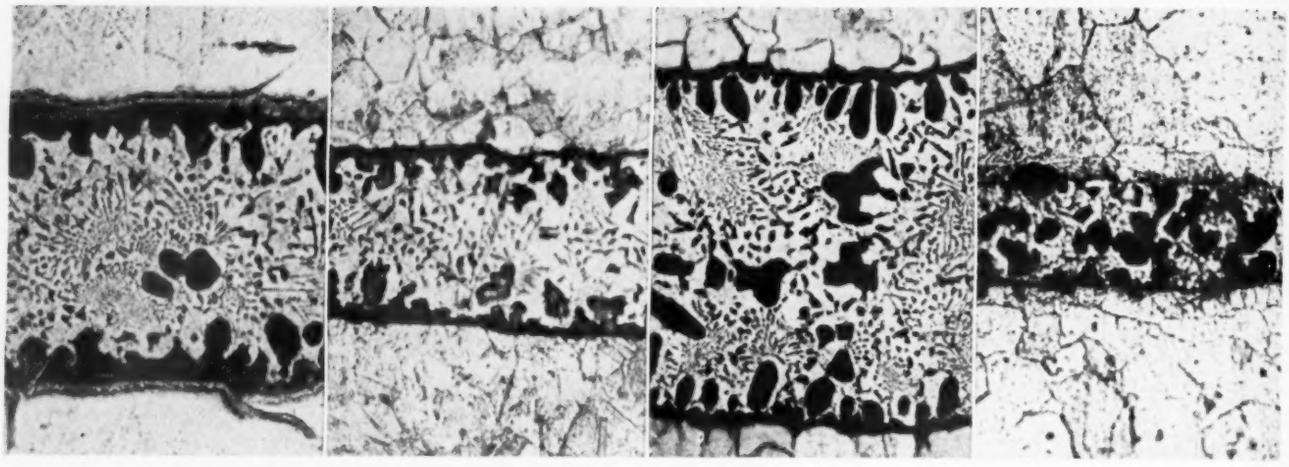


Fig. 2—Liquidus diagram of silver-copper-zinc alloys based upon a number of cooling curves. From Proceedings of A. S. T. M., Vol. 30, part II, 1930

From a paper presented at the fall meeting of the American Welding society in New York, Oct. 1-5, and published in full in the October issue of the *Journal* of that society. The author is manager, Handy & Harman, Bridgeport, Conn.



Brass soldered with 50 per cent silver, 34 per cent copper, 16 per cent zinc. Etched with ammonium hydroxide and hydrogen peroxide

Nickel silver soldered with 50 per cent silver, 34 per cent copper, 16 per cent zinc. Etched with acid ferric chloride

Copper soldered with 60 per cent silver, 25 per cent copper, 15 per cent zinc. Etched with ammonium hydroxide and hydrogen peroxide

Stainless steel soldered with 40 per cent silver, 30 per cent copper, 28 per cent zinc. Etched with chrome regia solution

Fig. 3—Photomicrographs of various silver-solder joints. X500

per cent in the highest grade. These alloys have high tensile strength and produce malleable castings which can be drawn into various sizes of wire and rolled into sheets of different thicknesses, thus allowing the solders to be supplied in the most convenient form for any particular class of work.

In general the addition of silver to copper-zinc alloys lowers the melting point and it is, therefore, possible to produce a series of ternary alloys which will flow freely at temperatures ranging from 1250 to 1600 degrees Fahr.

Determine Liquidus Points

Fig. 2 is a liquidus diagram of the silver-copper-zinc alloys which is based upon a large number of cooling curves made in the research laboratory of Handy & Harman, Bridgeport, Conn. The liquidus points were determined because from a practical point of view the liquidus or flow points of any alloy are of more importance than the solidus or melting point when it is used for brazing purposes.

With exception of those cases where eutectic compositions may be used, such as the silver-copper eutectic which contains approximately 72 per cent silver and 28 per cent copper which melts at 1435 degrees Fahr., there is a melting range between the solidus or melting point and the liquidus or flow point. This range will vary and the fluidity of the solder between these points will depend upon the proportion that solidifies at the liquidus temperature. The solidus point is important when second soldering operations are to be made on the same article, and also when the joint may be subjected to elevated temperatures in use. It is, therefore, advisable to know both the melting and flow points of the particular alloy which is used for soldering.

Those solders containing lower percentages of silver are less expensive but have higher flow points and, therefore, do not give a wide factor of safety when used for brazing metals or alloys that may be seriously damaged at the higher temperatures required for their use. In such cases the use of silver solders having higher percentages of silver and lower flow points are to be preferred. When joints of high ductility and malleability are required, as, for example, copper rods that are to be drawn into small diameter wire, silver solders containing from 70 to 80 per cent silver and small percentages of zinc have proved most satisfactory. Also the resistance to certain types of corrosion may justify the use of solders of high silver content. As a rule industrial users have found that solders within the range of 40 to 50 per cent silver will meet their needs when the use of the lower grades would involve too much risk of overheating the parts to be joined.

The rapid increase, however, during the past few years in the use of different types of welding and brazing processes has brought the question of the most suitable type of alloy for a given purpose more prominently than ever before those interested in joining metals. Great advancements have been made in equipment designed for supplying the heat necessary for welding and brazing, new alloys developed and the scientific side of the art of joining metals has enlisted the interest of engineers in the search for fundamental information that will give them a sound basis upon which to base their recommendations.

The particular places in which silver solders are more suitable than other types of alloys can be determined only by the consideration of many factors, such as physical properties, corrosion resistance, relative ease of application because of low melting point, strength of joint and cost, with the recognition that experience has shown that the free flowing properties of silver solders permit closely fitted joints and the use of a correspondingly small amount of solder.

Physical Properties

The user of silver solders is primarily interested in the physical properties of joints made with these solders, but at the same time the general characteristics of the solders themselves would seem sufficiently important for a brief description.

Any alloy which is satisfactory for brazing purposes must flow freely at a temperature below the melting point of the metals or alloys which are to be joined. In the introductory paragraphs on silver-copper-zinc alloys, general reference was made to the relatively low flow points of silver solders as compared with other braing alloys. Further reference to the liquidus diagam of the silver-copper-zinc system in Fig. 2 shows that the use of high percentages of zinc proportionately reduces the flow points, but there is a practical limitation to the amount of zinc which can be used because of the brittleness of the resulting alloy. With the silver content as low as 10 per cent the percentage of zinc should not exceed 40 per cent for the production of malleable and ductile alloys and the flow point will be approximately 1600 degrees Fahr. With 65 per cent silver and 25 per cent zinc the flow point drops to approximately 1250 degrees Fahr. An alloy of this composition is malleable but in actual practice it is not customary to use

over 15 per cent zinc which raises the flow point to approximately 1300 degres Fahr. A composition which is widely used for industrial purposes contains 50 per cent silver, 34 per cent copper and 16 per cent zinc and flows freely at 1435 degrees Fahr.

The addition of cadmium to solders containing high percentages of zinc increases their malleability and ductility but the effect on the flow point depends upon the composition of the solder. In those silver solders containing lower percentages of silver it is possible to use a combined zinc and cadmium content sufficiently large to lower appreciably the flow point and still produce a malleable alloy.

Tin also has the effect of lowering the flow point but, if used in considerable amount, is likely to cause brittleness.

Any unaltered solder which may remain in the joint will have the physical properties of a thin casting regardless of the form in which the solder may have been used. Nearly all silver solders which have proved satisfactory can be cast into wire bars or ingots which will stand at least 50 per cent reduction in cold working without any signs of failure.

Silver solders are resistant to the ordinary atmospheric corrosion. They are attacked by nitric acid and discolored by gases or products containing sulphur. Experience has shown that their corrosion resistance compares favorably with the various nonferrous metals and alloys which have wide industrial use because of their corrosion-resistant properties. The high-grade solders particularly are used in the manufacture of chemical products and the silver-copper eutectic is often used as a silver solder where the presence of zinc in the alloy would be harmful.

The electrical conductivity of silver solders varies considerably with different compositions. In the silver-copper-zinc silver solders the percentage of zincs appears to have the greatest influence on reducing the electrical conductivity. Where conductivity is important the higher grade solders with low melting points have comparatively high conductivity. The specific gravity of some of these alloys will run from approximately 8½ to 10.

Methods of Using Solders

Development of torches, furnaces and electrical devices gives a wide range of equipment which is suitable for supplying the heat necessary for joining metals with silver solders. Although the better types of air and gas torches are used to considerable extent, the oxyacetylene torch gives a wide range of flexibility and quick heating. The necessity for preheating the surfaces to be joined is reduced and there is a saving of time as well as the advantage of being able to control the type of flame. When torches are used for heating there are two methods in use. In the first method the procedure is to bring the temperature of the joint up to or slightly above the flow point of the solder and then apply the solder to the joint directly under the torch flame. When joints are made in this manner silver solders will flow for considerable distances and penetrate into narrow openings.

Effects of Furnace Temperature

Furnace temperature, deg. Fahr.	Time to bring metal to 1300 deg. Fahr., minutes	Character of joint
1400	10	Poor. Partly melted solder on surface.
1600	5	Better but not satisfactory.
1800	2½	Good joint — solder had flowed well.

Solder Heats the Joint

The other method more nearly approximates the procedure sometimes followed in bronze welding where the sections to be joined are not brought up to a temperature above the flow point of the solder and the superheat in the solder itself is depended upon to bring the joint to the proper temperature. With the oxy-acetylene torch it is possible to supply heat to the joint so rapidly that the two methods to a casual observer may not be distinguishable and with the excellent equipment now obtainable a workman can soon acquire the necessary skill for applying the heat to any particular type of joint.

Thin strips or sheets of solder can be inserted between the surfaces to be joined before heating. In this method of making a joint with a torch flame the appearance of a thin line of molten solder along the outside edge is an indication that the proper temperature has been reached but it is important to see that clamps or supports are provided to hold the pieces together firmly.

Different types of furnaces also are used for heating. The parts are assembled with the solder either along or in the joint and the assembled unit placed in the furnace. In this type of heating the entire assembly has to be brought to a temperature above the flow point of the solder and the time required for heating will depend upon the temperature of the furnace, rate of heat input, size of the assembled part in relation to the furnace and the specific heat of the materials.

Rapid Heating Is Desirable

As a rule it is more satisfactory to run a furnace at a temperature considerably above that necessary to flow the solder and thereby reduce the time in the furnace. This necessitates that the time must be determined empirically but experience has shown that, other conditions being equal, the best results will be obtained if the solder is brought to the flow point as quickly as possible. Rapid heating seems to be particularly helpful in those cases where finely granulated solders are spread along the joint. To illustrate this point some interesting tests were made in the following manner.

Two pieces of 14-gage metal were assembled on a carbon block and 300-mesh solder sprinkled along the joint. The end of a thermocouple was then attached to one of the pieces of metal and the block introduced into a closed type electric fur-

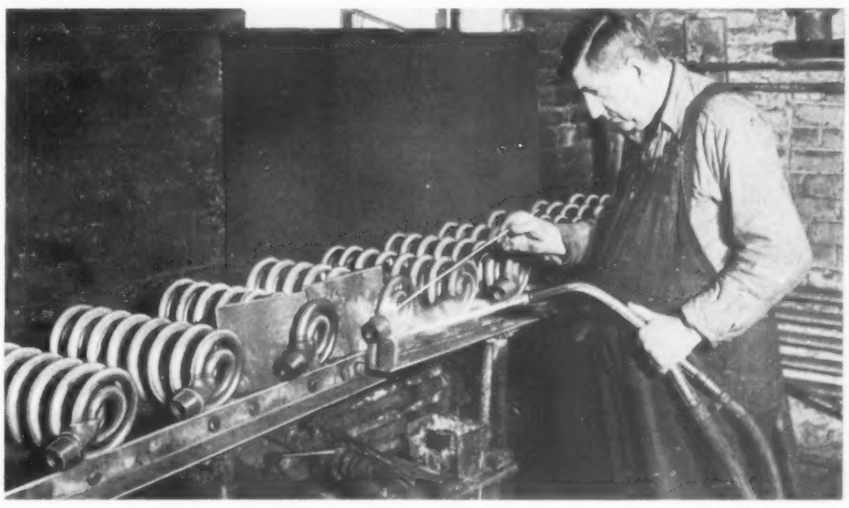


Fig. 4—Brazing two ends of copper water heater coils into a brass manifold with ordinary gas-air torch. Joint surfaces are brought to 1400 degrees Fahr., melting point of the flux, but 100 degrees over the melting point of the brazing alloy, assuring quick and free flowing

nace having a hydrogen atmosphere. The temperature of the furnace was taken with another pyrometer. The silver solder used was known to flow at 1300 degrees Fahr. and the assembly was removed as soon as the metal reached this temperature. The results obtained by using three different furnace temperatures are shown in the table on Page 31.

The atmosphere in a furnace used for brazing should be non-oxidizing. When the work involves the joining of a large number of pieces of uniform size, if proper attention is given to control of the furnace temperature and atmosphere, furnace heating is efficient and will give uniform and satisfactory results.

Different types of electric-resistance heating devices are available by which the heat is applied directly to the joint. Thin sheets of silver solder can be inserted in the joint; the principal advantage over ordinary welding is the lower temperature required to flow the solder. Many different types of joints can be made with this method and by using silver solders strong joints can be obtained at relatively low temperatures.

Proper control of the heat is an important factor in obtaining uniform and strong joints. Investigations have shown that the best silver soldered joints are obtained when there is some degree of diffusion between the solder and the metal. This diffusion is a time and temperature reaction and will vary with the type of metals being joined. With most nonferrous alloys microscopic examinations will show this diffusion. With steels and alloys which have melting points several hundred degrees above that of the solder it is more difficult to determine positively this point but the evidence obtained from the examination of a large number of specimens at high magnifications would seem to justify the statement that some degree of diffusion is present in all properly made silver solder joints. Fig. 3 shows some photomicrographs of silver solder joints.

Function of Fluxes

Before discussing the action of different fluxes it should be emphasized that joints should be clean and well fitted. Surface scale, oxides and all grease and foreign matter of any description should be removed. The function of the flux is three-fold: It offers a protective coating which tends to prevent oxidation, dissolves any oxides which may form and assists in the free flowing of the solder.

The last-named function is important and it has been found advantageous in some cases to use flux in furnaces having a reducing atmosphere such as hydrogen where oxidation could not take place. Capillary attraction is the principal force causing solders to flow and as the flux flows ahead of the solder and is displaced by it, it seems reasonable to assume that a nascent metal surface is thereby provided if the proper flux is used. The term nascent may not be the correct one, but the thought which it is meant to convey is that for proper joining both the surface of the solder and the surface of the metal should be absolutely free of any oxide films or adsorbed gas films.

Borax Is Suitable

A number of good fluxes are made by different manufacturers and the choice of flux depends largely upon individual preference. Fluxes that fume badly are, of course, objectionable to the workman but the flux must be fluid and active at the temperature used for soldering. Borax will dissolve the oxides of most of the metals and becomes a thin fluid at a temperature of 1400 degrees Fahr. Water of crystallization in ordinary borax causes bubbling of the flux during the preliminary heating and this objection can be overcome by using the anhydrous form of borax.

Boric acid is used commonly in connection with borax and has the particular property of spreading over the surface at a low temperature and offers protection against oxidation. It does not dissolve oxides as readily as borax, and mixtures of borax and boric acid become viscous at higher temperatures than borax alone. When joining metals having refractory oxides such as chromium, it is necessary to use special fluxes to remove them. Thin films of these oxides which cannot be seen will be quite sufficient to prevent good bonding. Fluxes containing either halogen or fluorine compounds are recommended in removing these oxides.

One of the principal advantages in the use of silver solders is the strong joints which may be obtained at relatively low temperatures and it would seem logical, therefore, to use a flux which was fluid and active at these temperatures. If the joint is one that does not require the solder to flow for any appreciable distance a more viscous flux may not seriously affect the results.

It is advisable to protect both the surfaces along the joint and the solder with the flux. It is a practice in some plants to assume that sufficient flux will adhere to the solder to clean off any oxide but the objection to this is the formation of oxides on the surface of the joint while the heating is being done and the time spent in protecting joints with flux during the heating is justified. Some users will apply flux along the joint but neglect to protect the solder because it requires an extra operation. It is a simple matter for the workman to dip the end of the solder into a small can of flux paste, and this added precaution against troubles from oxidation is advisable. One of the objections which is raised to spreading the flux along the joints is that the solder will flow over the surface at the sides of the joint where it is not needed. If the pieces to be joined are jigged so that the workman is free to apply the solder properly he will use only a sufficient amount to fill the joint and there should be no appreciable waste of solder from this source.

The use of flux in a paste form or a hot saturated solution is convenient because it can be brushed along the joint, thus insuring a more uniform protection and less likelihood of bare spots which will oxidize during the period of heating. In the final analysis the choice of flux and the best method of applying it will depend upon the metals to be joined, method used in heating and the type of joint. It cannot be too strongly emphasized that clean joints and careful attention to the selection and use of a suitable flux are essential to the production of sound joints.

Special Solders

The satisfactory results which have been obtained for many years with the ternary alloys enumerated in the first part of this discussion at least establishes a standard to which other silver alloys can be compared. With the increasing use of different types of corrosion-resistant base metal alloys and stainless steels there is an increasing interest in determining whether it would not be possible to produce more satisfactory alloys.

The substitution of either nickel or manganese or both for part of the copper and zinc in standard silver solders produces a series of alloys which may be more satisfactory in resisting certain types of corrosion. Some of these alloys are not as free flowing as the better known silver solders, but satisfactory joints can be made with them at approximately the same temperatures. One of the fields where these alloys might find more extensive use is in brazing stainless steel.

There is a diversity of opinion in regard to the advantages of using silver solders with stainless steels. Strong joints can be made with a wide range of compositions, but the temperatures required for the use of silver solders come within what has generally been accepted as the critical range which causes carbide precipitation and that is probably one of the reasons why silver solders have not been more widely used.

It is possible to produce a malleable and ductile silver solder containing sufficient combined zinc and cadmium to bring the flow point below 1200 degrees Fahr. If carbide

(*Please turn to Page* 60)

SUPPORTING members of this 2300-foot pier at Davenport, Calif., are of steel H-piling, encased in 24-inch pipe, with cement poured between piling and pipe. This construction is shown at the left. The pier carries a pipeline which transports bulk cement from a plant on shore to holds of ocean vessels

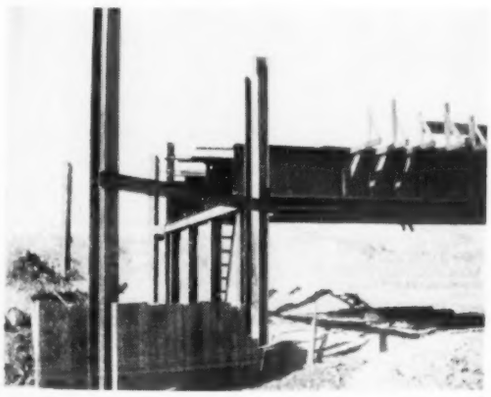
H-Piling Finds Use in Piers, Bridges and Fish Traps

WITHIN the last seven or eight years the use of H-type structural steel piles has spread to include many and varied types of construction on the Pacific coast. The largest uses so far developed have been in bridges wharves or piers but they have also found use in building and other types of construction.

According to W. E. Emmett, district engineer, American Institute of Steel Construction, San Francisco, the first installation of this type of construction in California was in the construction of a pleasure pier at Oceanside in 1927. This pier replaced one built on piles of railroad rails. With the pier extending for some distance off shore, the piles are subjected to the salt water spray action as well as the erosive action of shifting sands. About a year ago the piles on this job were examined by an engineer representing a large public body and his report was to the effect that the piles had a probable life of 75 years. Deterioration in six years was so negligible as to be almost unmeasurable.

About six years ago oil companies began to make extensive explorations off the coast of southern California. To do this work it was necessary to build extensive piers reaching well off shore. This work placed severe requirements on piles. They must not be cumbersome to handle even though they must in many cases be of considerable length. They had to stand the punishment of hard driving because in many places they were driven into shale or rockly formation. Lastly they must have endurance, as these workings are intended to last for many years. The steel H-pile filled all of the above conditions. These piers stand today practically in as good condition as when they were erected.

A few years ago excessively hard driving was encountered in one of the piers for the Garden Highway bridge over the American river north of Sacramento, Calif. Wood piles had been driven under the other piers but it seemed impossible to get them down in this case. Half the number of H-piles were substituted to the entire satisfaction of the engineer in charge. These were driven with comparative ease through cemented gravel and cobbles. In two subsequent bridges over the same stream steel



USE of H-piles for abutments is shown at the left, while at the right is a small steel pile bridge, the piles being driven in relatively soft strata

This bridge in Los Angeles county, California, is supported on 10-inch 49-pound H-piles encased in concrete above the stream bed. Cost of this construction was reported to have been about $300 less than for other types of piling

H-piles have given satisfactory results.

Recently the Santa Cruz Portland Cement Co. constructed a pier at Davenport, Calif. which reaches about 2300 feet out into the ocean. This pier was built to carry a pipe line through which cement will be pumped from the cement mill to ships which will carry the bulk material to various distributing plants. Steel H-piles were adopted for this work and were driven without protection until the pier reached about 1000 feet off shore. For the remaining 1300 feet the piles were strengthened and protected by surrounding them with 24-inch steel pipe. The pipe was driven into the rock or shale about 3 feet and the piles were then driven inside the tubes to a penetration of about 6 or 8 feet. After the piles were driven concrete was poured around them, filling the tubes. In addition to the steel piles about 12,000 feet of 24-inch seamless pipe was used on the job. This extra addition to the strength of the piles is necessitated by the heavy seas encountered at this point.

Used in Large Structures

Other large structures where H-piles have been used are; The Bradley overcrossing east of Merced, Calif., where 6600 feet of piling was used; the Monterey bridge over the Santa Clara river where 21,000 feet was used under the piers and abutments; and the Jenner bridge over the Russian river where H-piles were used beneath the foundations. The states of Arizona and Nevada have built some H-pile structures and recently they were specified to support the foundations for a bridge for Pierce county, Washington.

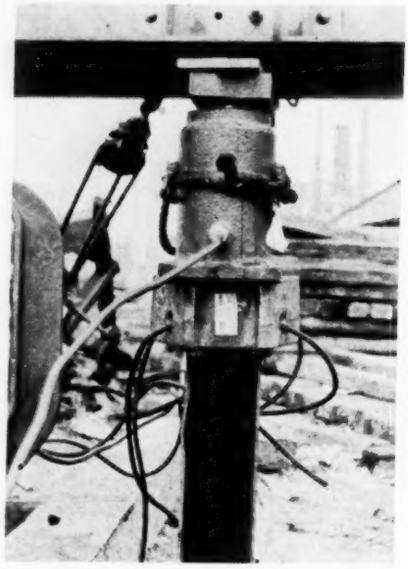
In constructing the municipal garage at Oakland, Calif., soft material was encountered in the foundations. The problem was satisfactorily solved by the use of steel H-piles. In order to insure proper carrying capacity, H-sections of the same size as the main members were welded to the piles at the bottom before driving thus giving more resisting area. Various attachments have been devised to increase the capacity of the piles. In the above mentioned case the job is standing today without any settling.

About three years ago the Columbia Steel Co. sent an engineer, H. L. Christie, to the Northwest to investigate the possibilities for the use of steel by the fishing industry in its workings on Puget sound and off the Alaska coast. Through R. B. Hart, vice president of the Alaska Packing Corp., it was arranged to try H-piles in the construction of a fish trap at Alitak, Alaska. The report of C. Mathews, superintendent at Alitak, gives some idea of the satisfaction obtained. The following are excerpts from his report.

"The piles were driven in the same manner as wood piles but in a location 50 feet farther off shore where the wood piles probably would not hold. They were driven into rocky bottom to a penetration of from 3½ to 7 feet. The flexibility of the steel piles made them much easier to align though the trap is stiffer due to bolted rather than lashed joints.

"The trap is superior where left the year round, as no deterioration is noticeable after two seasons. On account of the perfect alignment obtained and the absence of heavy butt ends the cotton web of pot, spiller and tunnels 'set' in a more perfect manner and make a better trap."

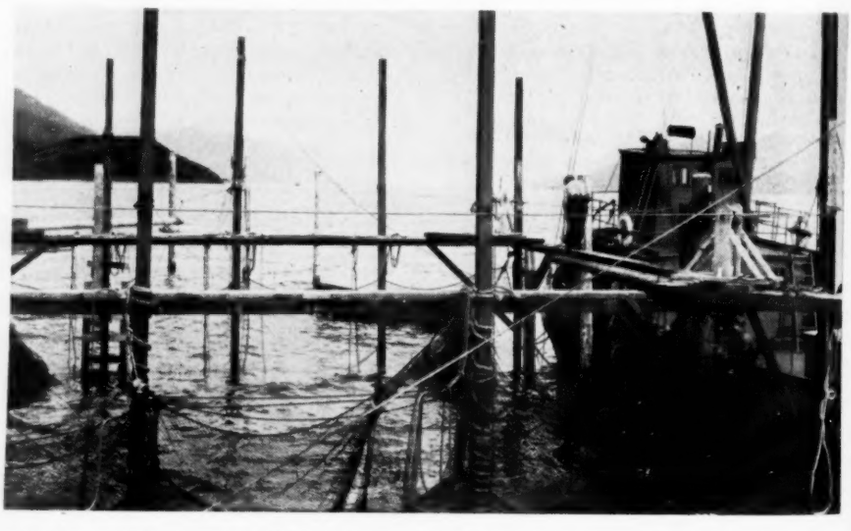
While H-piles are particularly adapted to hard driving they have proved themselves perfectly capable of holding their own in soft ground. They drive easily but will show surprising carrying capacity.



In this test of an H-piling section, the pile was loaded until crippling occurred at the top, as shown. Settling under load producing crippling was ½-inch, almost entirely recovered upon release of load

Chains Used as Drags for Harvesting Aquatic Plants

An interesting new use of chain is in the form of drags for harvesting aquatic plants from inland lakes. During the past summer investigations conducted by Dr. R. A. Gortner, chief of the division of agricultural biochemistry at the University of Minnesota, St. Paul, Minn., showed that plants and weeds in Minnesota lakes are rich in animal food values and in this respect compare favorably with alfalfa and soy bean hay. Dr. Gortner's discoveries are regarded as paving the way toward extensive harvesting of these plants from Minnesota's 10,000 lakes.



This large fish trap at Alitak, Alaska, has a frame of steel H-piling, driven into a rocky bottom to a distance of from 3½ to 7 feet

Tantalum Sheets 0.005-Inch Thick Now Welded by the Electric Arc

TANTALUM sheets valued at $50 a pound and so thin that it takes 200 of them to make an inch are being arc welded in the fabrication of chemical equipment. The metal tantalum possesses characteristics which make it especially valuable in the manufacture of all types of laboratory accessories. It is not tarnished by air or attacked by acids, except hydrochloric. In tensile strength it is two and one-half times as strong as platinum. It combines softness with workability and has great resistance to wet corrosion.

Tantalum is a rare metallic element found in association with niobium and little used commercially until recent years. Most of the supply comes from Australia, although it is found in the United States in small quantities in North Carolina, Colorado, and in the Black Hills of the Dakotas. Sweden, Norway, Greenland, Madagascar and Rhodesia are other localities where it is known to exist.

Fansteel Products Inc., Chicago, is one of the largest suppliers of tantalum. It is this company which developed and perfected a method for welding this rare metal, thereby increasing its field of usefulness.

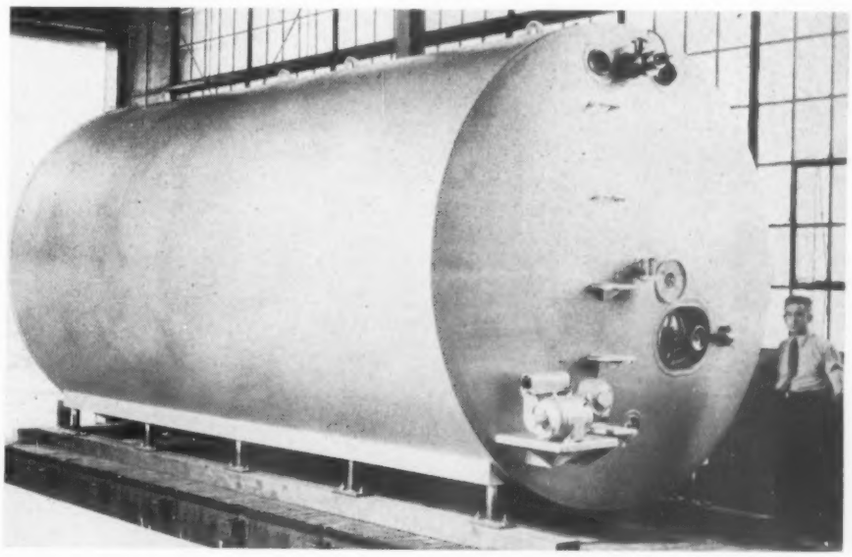
Special Technique Developed

Exacting requirements covering the articles fabricated from tantalum have made it necessary to develop a special technique for welding it. Some of the most important factors which must be considered in working with this metal are as follows: Spoilage must be reduced to a minimum; finished welds must be strong, ductile and both gas and liquid tight under pressure and vacuum; tantalum cannot be deposited from an electrode without so embrittling welds as to make them unusable; it cannot be heated in air much above 650 degrees Fahr. without becoming hard and brittle; and the melting point is above 5100 degrees Fahr.

The method finally adopted consists of first forming a straight angle flange at all edges of the sheets to be arc welded. These flanges are then fitted together and tack welded in a few places to avoid shifting the assembly. The job then is immersed in a tank filled with carbon tetrachloride so that the edge to be welded is approximately ¼-inch below the surface of the liquid.

Immersion in carbon tetrachloride requires higher voltage across the arc than would be needed to weld in air, and at the same time, the thinness of the stock being welded and the necessity for strict localization of the heat, demand low welding current. Hard carbon electrodes ⅛-inch in diameter, held in small light electrode holders, are used. The welding current must be of normal polarity.

Stability of the arc and ease of



LARGE MILK STORAGE TANK OF STAINLESS: Said to be the largest of its type in the world, this 12,000-gallon ammonia-cooled milk storage tank recently was installed by the York Ice Machinery Corp., York, Pa., in the plant of the Hershey Chocolate Corp., Hershey, Pa., to be used in conjunction with a York internal-tube type cooler for the storage of milk prior to processing for the manufacture of milk chocolate. The container weighs 18,000 pounds, measures 9 feet 10 inches in diameter and 21 feet 8 inches in length, and is built of 14-gage chrome-nickel alloy. Outer casing is of ⅜-inch stainless steel, aluminum painted, and supplied by Republic Steel Corp., Youngstown, O. The tank is equipped with a gravity feed ammonia control system

striking it as well as freedom from blowing are absolutely essential for producing good welds. An open circuit voltage of 50 which falls to about 25 across the arc usually produces satisfactory welds. Current depends on the thickness of metal, 0.005-inch stock requiring only 15 amperes and 0.025-inch 60 amperes. Welding equipment manufactured by the Lincoln Electric Co., Cleveland, is used in this work.

S S S

Making Cast Iron By Arc Furnace

THE most interesting new application of the rocking-type, single-phase, indirect arc electric furnace is the melting of cast iron, or the duplexing with cupola for superheating or alloying, and the production of white iron for short-cycle malleable. Aside from the melting of iron which started on the West Coast and in Canada during the war, where electricity was available and coke scarce, the first gray iron made electrically for its special properties was produced in St. Louis in 1919 and cast into piston rings.

Enough is known about the art to insure high quality in the product; some foundries are willing to accept specifications on cast irons, alloyed and heat treated, to meet such properties as 50,000 pounds per square inch ultimate strength and 15 per cent elongation, 75,000 pounds ultimate and 10 per cent elongation, or 100,000 pounds ultimate and 6 per cent elongation.

The difficulty is in finding customers who are willing to pay a higher price for the products, even though a gray iron casting may be redesigned to weigh half as much in the high strength varieties. The physicals quoted really establish a properly made iron casting in competition with steel castings and many steel forgings, and have been responsible for a considerable shift in business.

Principal outlets so far have been to makers of gas engines, for cylinders and cylinder heads, camshafts, crankshafts, brake beams, valves and tappets, although the electric industry, refrigeration industry, farm equipment industry, household device manufacturers, and heavy machinery industry, absorb a considerable tonnage of alloy or high-test gray iron. Much of the production is alloyed with fractional percentages of nickel, copper, chromium and molybdenum.

Another important discovery has been that arc furnaces can be operated on high chromium steels—stainless and heat-resisting—without running the carbon up beyond specification.

S S S

Engine Plant in England Paints Machinery Green

Color in the finishing of machinery is a topic of much current discussion. From England comes a brief pertinent comment on the subject which brings out that the engineering industry in that country also is waking up to the importance of the psychological effects of color on its employes. An example of this is the painting of new machinery in the Armstrong-Siddeley car and aero engine factory in Coventry in a quiet soft shade of green instead of the usual black or gray.

Green was chosen because, being the middle color of the spectrum, it is restful to the eye. Men working on a green machine would, it is argued, do better work. Another reason for its choice is that it shows up oil leaks or dirtiness which a darker color would tend to hide. The green machinery therefore encourages cleanliness and with it efficiency, announcement declares. This point of view is somewhat controversial. Some engineers prefer to employ a color which will not show up oil stains or smudges caused by grease on the hands of the operator.

S S S

Section Irregularities Are Sources of Weld Failures

Study of fatigue failures in welds, according to a recent report, shows that most of such failures originate in minute cracks at many points simultaneously and that these spread and ultimately combine with corresponding intensification. By reducing the number of base points for such cracks the designer can increase the fatigue resistance of the part. These base points, according to this report, occurred where there are found irregularities and sudden changes in the cross section, so that by eliminating such irregularities and sudden changes, the fatigue resistance is increased.

S S S

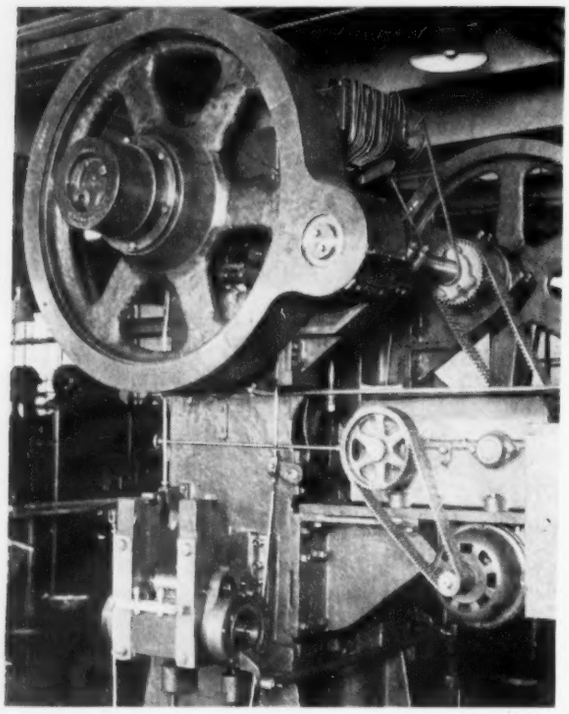
Avoiding Hard Deposited Metal in Arc Welding

When building up low spots or worn surfaces on steel castings for salvage purposes by the use of a carbon arc, no carbon deposit from ordinary mild steel welding rod is carried over into the work piece if the work piece is made the positive electrode. This is because there is no tendency to carry over carbon in the ionized gas stream between the work and carbon rod. If the work piece be made the positive electrode, therefore, the deposited metal will not be hard.

S S S

Finding More Uses for Electric Inductive Heat

A large and leading producer of razor blades is using 18 electric inductive heating units for heat treating its product and another company is utilizing the same method to heat treat special surfaces of its product where a localized hardening is desired. In the latter case, the surface to be hardened is quickly brought up



CHAIN DRIVE ON PUNCH PRESS: Among new equipment installed this year in the Dodge plant of Link-Belt Co., Indianapolis, is this heavy-duty punch press for production of chain links. It is of shrunk-in tie rod construction; is equipped with double roll feeds and automatic lubrication; and was specially built by E. W. Bliss Co., Toledo, O. Two features of the installation are significant: The silent chain drive and the Link-Belt P.I.V. gear system of accurate positive speed control. As will be seen the motor and gear reduction unit are secured to the press frame on a special bracket

DEPENDABILITY

Dependability . . . "The quality of being relied upon or of being trustworthy".

The things that go to make up this "quality" are part and parcel of the West Leechburg policy.

The product—*good strip steel*—may be relied upon and the service is trustworthy.

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We also roll and sell all grades of ALLEGHENY *stainless steel in strip form.*

HOT AND COLD ROLLED WLSCo STRIP STEEL

WEST LEECHBURG STEEL COMPANY

General Offices: UNION BANK BLDG., PITTSBURGH, PA.

Branch Sales Offices:

NEW YORK • CHICAGO • DETROIT • CLEVELAND • DAYTON, OHIO • ST. LOUIS • TOLEDO [Dean Higgins & Co.] • NEWARK [Edgcomb Steel Corp.] • PHILADELPHIA [Edgcomb Steel Co.] • TORONTO, ONT. [Jessop Steel Co.]

BUFFALO—ROCHESTER—SYRACUSE [Brace-Mueller-Huntley, Inc.]

Warehouse Stocks of Cold Rolled Strip Steel are carried by:

EDGCOMB STEEL CO.—PHILADELPHIA • EDGCOMB STEEL CORP.—NEWARK • JOS. T. RYERSON & SON—CHICAGO

to the required temperature and quenched in special apparatus before the subsurface or other portions are in any way affected.

A large automobile company is effectively drying painted or enameled surfaces in specially constructed ovens, heated by inductive electric heat. This application of inductive electricity is in its infancy. A potent argument in favor of the method is that the heat is not applied from the outside; it is induced in the object itself and hence operates from the inside out for which special advantages are claimed.

Welded Steel Wire Milk Bottle Crates Used in Thousands by Dairy Industry

UNITED milk bottle crates are money savers," says United Steel & Wire Co., Battle Creek, Mich., and Kansas City, Mo., in reference to its line of steel wire bottle cases.

"Steel wire cases are replacing old wood cases, as they weigh 6 to 10 pounds less and last longer because they do not rot, fall apart or break," says the company. "Best of all, they are absolutely sanitary and represent a real economy and a business builder for dairies."

Wide Variety of Sizes

United cases have been manufactured for the past eight years and are now being used by many leading dairy interests all over the United States and in foreign countries. Installations vary from one dozen to 6000 cases in a single plant. Built in various sizes, these crates are supplied for quart bottles, pint bottles and half pint bottles. They also are made special to accommodate special sizes of bottles.

A 12-quart crate is shown in the accompanying illustration. This crate is manufactured with No. 0 gage wire for the top, No. 000 wire for the bottom and No. 7 for the side wires and partition wires. The 12-quart size illustrated weighs 9½ pounds net.

Construction used in the fabrication of these crates is brought about through permanently electrically welding each wire joint or intersection of material. This construction not only insures strength and durability, but also eliminates cracks and crevices where ordinarily dirt and bacteria might lodge. Each case, after fabrication, is provided either with a tin plate finish, or a hot dipped galvanized finish. The company recommends galvanized finish as it has found through the salt spray test that this galvanized finish is harder and more serviceable than the tinned finish.

These crates also are sold to foreign countries and the company is enjoying an increasing sales volume from the West Indies, Panama and many South American countries because of existing health and sanitary requirements specified by milk inspectors in warm southern climates.

Welded steel wire milk bottle crate finished either tinned or galvanized and installed in dairies here and abroad in large quantities

Stainless Trains Now in Quantity Production

Through the installation of special equipment the Edward G. Budd Mfg. Co., Philadelphia, now is prepared to use its shotweld process in the quantity production of light-weight high-speed trains of stainless steel, according to a statement by E. G. Budd, president.

"After an experimental development, extending over three years, during which Budd engineers have manufactured cars and high-speed self-propelled trains for four different railroads," said Mr. Budd, "we are now equipped for the economical manufacture, in quantity production, of trains similar to the Burlington Zephyr and other trains that are now revolutionizing railroad transportation methods.

"The experience gained through our construction of the Zephyr and other units has enabled us to build special dies, jigs, tools, welding equipment, etc., for better car construction. This equipment is installed in one of our large buildings in the Philadelphia plant which has been reconstructed for straight line production with two tracks running down through its center, with the necessary wells and pits. These tracks connect with the yard where ample rail storage facilities are being provided sufficient for a number of trains. These sidings connect with both the Pennsylvania rai road and the main line of the Reading.

"Already three trains are under construction, one for the Burlington and two for the Boston & Maine, and considerably over 1500 men are employed now on three shifts. Additional labor is being put on every day.

"The Budd shop in which the Burlington Zephyr was built is now engaged entirely in the manufacture of structural stainless steel parts for the United States navy, and it too has been provided with added welding and machining equipment. Construction under existing navy contracts will mount progressively during the next few months."

Nondestructive Magnetic Testing Yields Profits

Of all phases of steel production and utilization where progress yields abundant profits without involving plant expansion or costly rebuilding, the field of inspection holds the richest possibilities, says Dr. Sigfrid Specht, chief engineer, the Ferrous Magnetic Corp., New York, in the *Ferrogram* for October. The reasons are obvious.

Nondestructive tests and continuous automatic inspection have been made possible by magnetic methods and apparatus.

Some fabricators, knowing this, are tending to demand "perfect" stock and to penalize producers more and more heavily.

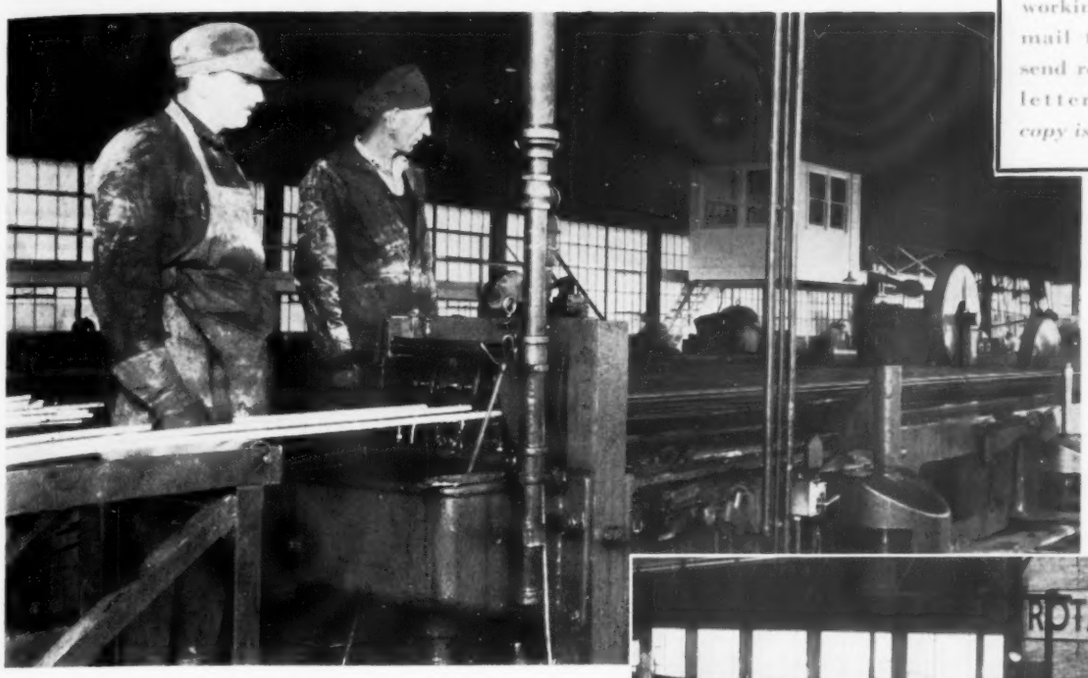
Producers for the first time see in plain sight the goal of 100 per cent inspection of every inch of stock for any or all classes of hidden defects, making possible a steady market absolutely free from "come-backs" and disputes.

Fabricators for the first time have within their reach the possibility of

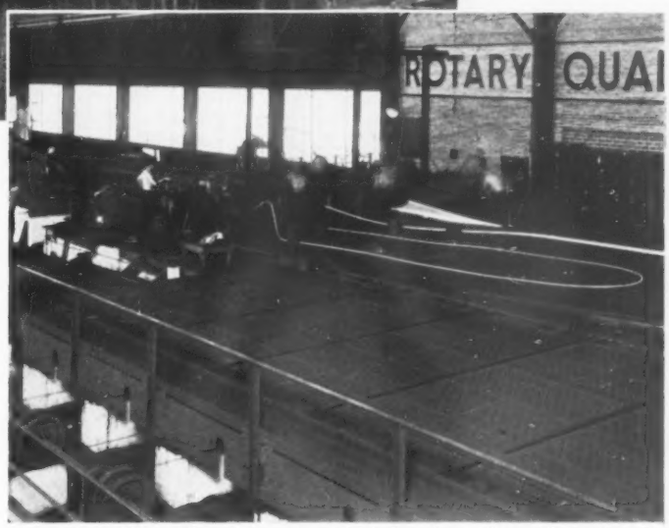
GULF HELPS YOU MAKE DEFINITE COST SAVINGS!

NOTE:

The booklet below will be sent to all executives and engineers in steel mills and metal working plants who mail the coupon or send request on their letterheads. *Your copy is ready.*



One of the draw benches in the plant of the Rotary Electric Steel Company at Detroit, Mich., producing three cold drawn steel bars at a time. The bars are sheared to uniform lengths, then machine straightened for use in making automobile parts, etc.



12-inch hot rolling mill producing "rounds" in long bars. They are later sheared to convenient lengths, then pointed and pickled (to remove all surface scale) preparatory to cold drawing as shown in the photograph above. Gulf lubricants are used to keep maintenance and power costs down in the Rotary Electric plant.

Look to maintenance and power for your real lubrication costs!

Leaders in all branches of the steel and metal working industries are giving particular attention to lubrication as a source of savings in maintenance and power costs. Cost of lubricants alone is a trifle compared to the other items of plant cost which are influenced by lubrication.

Gulf engineers, working with your plant personnel, can make definite savings in the operation of your machinery—in repair, maintenance and power costs. *Those are your real lubrication costs.* To determine the true cost of lubrication for any plant, these items must be considered.

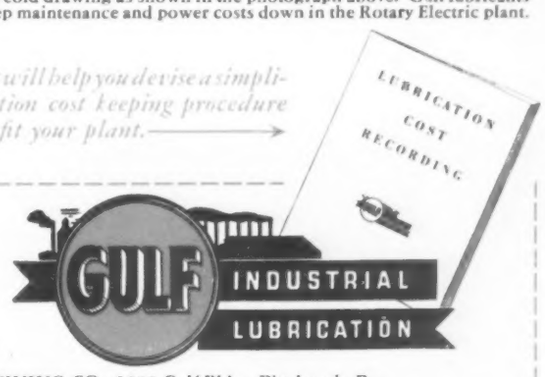
Gulf will co-operate with you in setting up a system which will reflect the influence of lubrication on your more important items of plant cost. The booklet shown on this page is offered with that service in view. We suggest that you familiarize yourself with its contents.

GULF REFINING COMPANY, Pittsburgh, Pa.

District Sales Offices:

Boston New York Philadelphia Atlanta New Orleans
Houston Pittsburgh Louisville Toledo

This booklet will help you devise a simplified lubrication cost keeping procedure which will fit your plant. →



S. 11

GULF REFINING CO., 3800 Gulf Bldg., Pittsburgh, Pa.
Please send me without obligation, the booklet "Lubrication Cost Recording."
Name.....
Title.....
Company.....
Address.....

placing large orders at lowest prices and classifying all incoming stock for different purposes without risk of error. A new and extremely interesting offshoot is that one of the purposes may be re-sale to manufacturers—a most profitable side-line.

Economic advantages are attractive: One inspector and two laborers can inspect and assort five miles of bar or tubing stock in one 7-hour day. To do an equivalent job without the new automatic instruments would take the same three men at least 80 working days. The inspector need not be a graduate engineer or trained physicist, because both the detection and the quantitative measurement of defects are automatic.

New Screw Used in Fabricating Steel House; Simple as Driving Nails

DRIVE screws—that drive like nails, but turn and hold like screws—for fastening steel to steel, wood to steel, steel to concrete and other materials, have been developed by the Hillwood Mfg. Co., Cleveland.

These screws are being used effectively in building steel houses; also in constructing frame houses where they have some advantages over ordinary nails, as in fastening flooring to studding so that floors are permanently "squeak-proof."

They also are being used for such widely diversified purposes as fabricating automobile bodies, fastening metal signs or supports to brick or concrete walls, dispensing with expansion bolts—and also for fastening high heels to women's shoes.

Holes need not be drilled for the screws, except where they are required to penetrate deep into steel, such as an I-beam. The accompanying illustration shows a 2 x 4-inch wood block fastened to an I-beam. In fastening sheet steel or wood to concrete, the nails are driven in just as a carpenter nails two pieces of wood together. Laying wood floors over a concrete foundation is as simple an operation as laying them on wood studs, and they hold firmly.

Heads of Various Types

The drive screws resemble ordinary nails. They are pointed like nails. They are made with a variety of heads to suit purposes to which they are put. They have spiral shanks. Wood nails with their shanks twisted into spirals have long been on the market, but these screws have several special features which are patented.

First, they are manufactured from square steel wire, of special composition. The square wire is drawn and twisted throughout its entire length into a continuous spiral. The pitch of the spirals is varied to suit different applications. The twisted wire is then fed into a nail machine. The screws are heat treated, and made extremely hard, but not brittle. In driving into the hardest concrete they do not bend or break. The manufacturers make the point that the screws are not merely case-hardened, but hardened throughout.

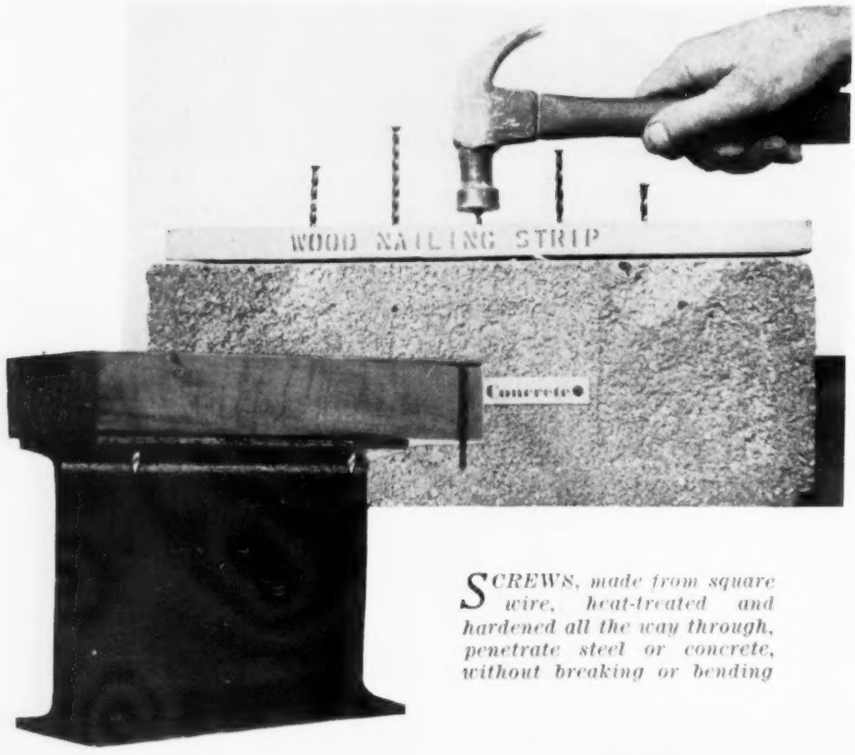
While the periphery of the screws is round, they actually make square holes in the material which they penetrate, the cross section of the wire being square. A "round" screw in a square hole is something of a novelty, and in practice it has been found to have remarkable holding power.

To give the screw a locking action when two pieces of sheet steel are fastened together, about ⅛-inch of the shank directly below the head is forced into a square cross section, parallel to the center line of the screw. This is formed at the same time as the head.

A large Ohio steel company which has developed steel houses used these screws in fastening enameled steel shingles. How to apply shingles quickly and economically, without damage to the finish, was a difficult problem.

If, as some steel authorities believe, the steel house offers one of the industry's greatest future markets, there also should be a large demand for ingeniously-contrived fastenings, something as easy to use and effective as ordinary nails in frame-house construction.

The Hillwood company for some years has been making tacks, and nail specialties such as upholstery nails.



SCREWS, made from square wire, heat-treated and hardened all the way through, penetrate steel or concrete, without breaking or bending

Stresses Importance of Reporting Injuries

When you receive a slight scratch or other wound at work, report it at once to your foreman. Get rid of the idea that there is some disgrace connected with reporting a slight wound or scratch. As a matter of fact, it is to your credit that you realize how serious a "slight" injury may be. This is the advice of Dr. R. M. Kelly, Western Electric Co., Chicago, who recently was elected health committee chairman of the National Safety Council, Inc., Chicago.

Let your foreman know immediately that you have been hurt and he will see that you receive expert first aid treatment, Dr. Kelly states in the Council's *News Letter*. In most modern plants the hospital always is prepared to give first aid. It is therefore the duty of everyone of you to protect yourself against serious complications which may result from trivial injuries by reporting every injury immediately, no matter how slight.

Easy to buy economical to use . . .

DISTRIBUTORS AND JOBBERS IN THESE MAJOR CITIES
SEATTLE LINCOLN ST. LOUIS ST. PAUL CHICAGO MILWAUKEE INDIANAPOLIS COLUMBUS DETROIT CLEVELAND BUFFALO ROCHESTER SYRACUSE BOSTON ALBANY NEW YORK BROOKLYN
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TONCAN
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IRON PIPE

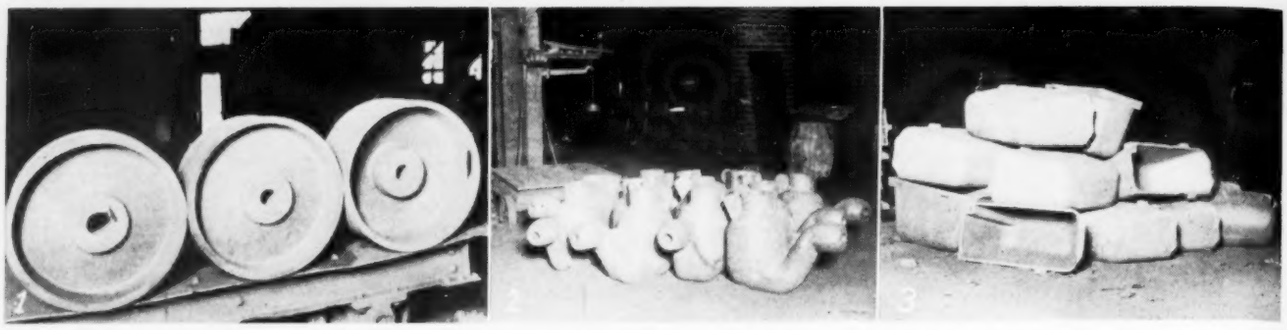
Place your finger on any part of the map of the United States and right near-by you will find a Toncan Iron Pipe distributor or jobber. Wherever your plant may be located—no matter where you are erecting a new building—you will find this modern alloy iron pipe easy and convenient to buy. This nation-wide distributing system is a direct result of the demand for Toncan Iron that has developed as its rust-resisting qualities have become known.

Toncan Iron Pipe is made of an alloy of open hearth iron, copper and molybdenum. Its slightly higher first cost is more than justified by its longer life and lower maintenance.

A copy of "Pipe for Permanence" will tell you all the facts. Sent on request.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES YOUNGSTOWN, OHIO



Crane brake drums (1) *are of cast meehanite heat treated and drawn at* 1150 *degrees Fahr., with brinell hardness of* 280; *goosenecks and melting pots for aluminum die casting machines* (2 *and* 3) *are of meehanite containing* 1.5 *per cent nickel and* 0.6 *to* 0.7 *per cent chromium*

High-Test Iron Supplied in Heat Treated or Alloy Form

MEEHANITE high strength iron castings now are being supplied heat treated and as-cast. They also are being supplied to alloy analyses. At the recent exposition of the Iron and Steel Electrical Engineers at Cleveland, the Fulton Foundry & Machine Co. Inc., Cleveland, featured many interesting uses to which such castings, in these three forms, have been put.

Meehanite fundamentally is a high test cast iron with an all pearlitic, 0.80 per cent carbon steel, matrix in which is distributed the fine graphite particles. The pearlite is so fine and curly that at magnifications of 500 to 1000 it appears to be almost 40 per cent sorbite. For this reason the metal is referred to as sorbo-pearlitic. The metal possesses great thermal stability against dissociation under heat, thus making it possible to get this all-pearlitic structure in all sections of metal in the same castings and throughout the entire cross section of any individual section. It is definitely an engineering high test cast iron of high tensile strength, wear resistance and impact resistance. It is free from porosity, easily machinable and generally does not warp after machining.

One of the outstanding physical properties of the as-cast meehanite is its very high transverse strength and deflection values as related to tensile strength. The American Society for Testing Materials normal deflection minimum for iron of tensile strength of 50,000 pounds per square inch is 2800 pounds on the "B" bar, for iron of tensile strength of 60,000 pounds per square inch it is 3000 pounds. But meehanite as cast with 55,000 pounds tensile, has a transverse of 4000 pounds, and the deflection, impact and fatigue values all advance over normal high test iron expectations in about the same proportion. It is this relationship of over-normal physicals that qualifies meehanite for heavy machinery construction. Brinell hardness of the as-cast metal ranges between 196 and 210.

Applications Are Numerous

Fulton Foundry & Machine Co. Inc. has records of outstanding service results with meehanite in the as-cast condition. They include resistance to wear, deformation and failure in such parts as calender mill gears subjected to continuous heavy loads and heavy impact stresses. Included also are cams for regulating mechanical equipment, engine liners, guides for forging machines, sprockets, wire rope sheaves, brake drums, etc.

Meehanite responds readily to heat treatment. When heat treated, the tensile strength exceeds 75,000 pounds per square inch and the other physicals are improved proportionately. The hardness is controlled by the temperature of draw to suit the machining conditions, so that the maximum machinable hardness can be maintained as desired. Heat treating lowers the coefficient of friction, refines the grain structure and results in an all sorbite structure with the fine carbon inclusions.

Because the matrix of this metal is high carbon steel, it is subjected to the same heat treating cycles as ordinary high carbon steel. The general procedure is to preheat to 1000 degrees Fahr., raise the temperature to 1575, quench in oil and draw back to between 1000 and 1200 degrees Fahr., according to the physical properties desired.

In pioneering the heat treatment of these castings, Fulton Foundry & Machine Co. Inc. has developed standards of heat treating so as to obtain machinable castings in various classes of work; the hardness is kept to those maximum values 280 to 300 brinell, beyond which machining costs would be expensive. A wide range of applications for heat treated castings, drawn to maximum machinable hard-

Replacement pitmans for presses (4) *are meehanite as cast; gas engine exhaust elbows* (5) *contain* 1 *per cent nickel and* 0.5 *per cent chromium; refractories crusher castings* (6) *contain molybdenum and chromium*

ness has been developed. The practice is to ship the castings already heat treated to the customer's requirements.

Some of the recent applications of heat treated meehanite are as follows: Metal working dies, cams, gears, cylinder liners, bearing bushings, slides, rams, special machine parts, track wheels, heavy duty brake drums, large piston rings for steam engines, grinding segments, conveyor flights, and many miscellaneous machinery parts requiring resistance to wear, impact, fatigue and pressure.

The influence of alloys in meehanite quite generally corresponds to the influence generally claimed by the alloy manufacturers with the difference that with meehanite the base metal at the start already has high strength properties. The alloys are used most generally to obtain certain corrosion and chemical properties rather than strength changes. Nevertheless, alloy is sometimes used for strength and meehanite with more than 60,000 pounds per square inch tensile strength easily is obtained with certain alloy combinations of molybdenum and chromium.

Alloyed To Resist Heat

Certain silicon-chromium combinations are used for heat-resistant services up to 1600 degrees Fahr. Nickel-chromium combinations have been found excellent to resist absorption of molten aluminum and this alloy is used for nozzles, goosenecks, and melting pots in the aluminum die casting industry. This same nickel-chromium alloy is used to resist corrosion in the presence of hot gases; such applications include valve seats for large combustion engines, exhaust manifolds for diesel engines, and other parts for similar service. Certain chromium-molybdenum combinations produce very hard castings that still are tough and strong. In other words, the brittleness usually associated with hard irons has been removed. This alloy combination has useful applications for certain wear resistant parts where machinability is not required, such as muller wheel tires, bottom plates for pan grinders, grinding mill parts, mill guides, etc.

Fulton Foundry & Machine Co. Inc. emphasizes that meehanite as-cast iron continues fully adequate to meeting the great majority of requirements in connection with heavy duty castings in which great rigidity and resistance to wear, impact and pressure are required. It is in meeting super-requirements along these lines that the castings are heat treated or produced in alloy forms. The selection in each case depends on the service condition to which the particular casting is to be subjected.

Meehanite castings now are produced by 20 licensed foundries in the United States, four in England and ten in Europe. Experience and research work of all these licensees are co-ordinated through the Meehanite Research institute through which practical research is continuously being carried out and co-ordinated by semiannual meetings of the licensed members.

Plans Being Arranged for Power Show, Dec. 3-8

Practical power cost saving equipment, and exhibits to demonstrate each new mechanical development in action, will be featured at the eleventh national exposition of power and mechanical engineering, to be held at Grand Central Palace, New York, Dec. 3-8.

The Power show will augment air conditioning and refrigerating equipment with a complete display of industrial fans and blowers. The airplane type propeller fan also will be featured. Smoke abatement will be aided by flue gas scrubbers, known as "dedusters". Centrifugal type turbo compressors and gas boosters will be shown by one exhibitor who also will feature a portable factory cleaner of new design.

The refractory and insulation section of the Power exposition will include fireclays of many types, chrome refractories, light weight refractories, special clays, high temperature bonding mortars, acid proof brick, and insulating brick.

Heat insulating materials this year will show consistent development as a result of continous industrial research. Numerous low temperature insulating materials will be offered for the heating and ventilating industry. Protective coatings will include specialties for boiler steel.

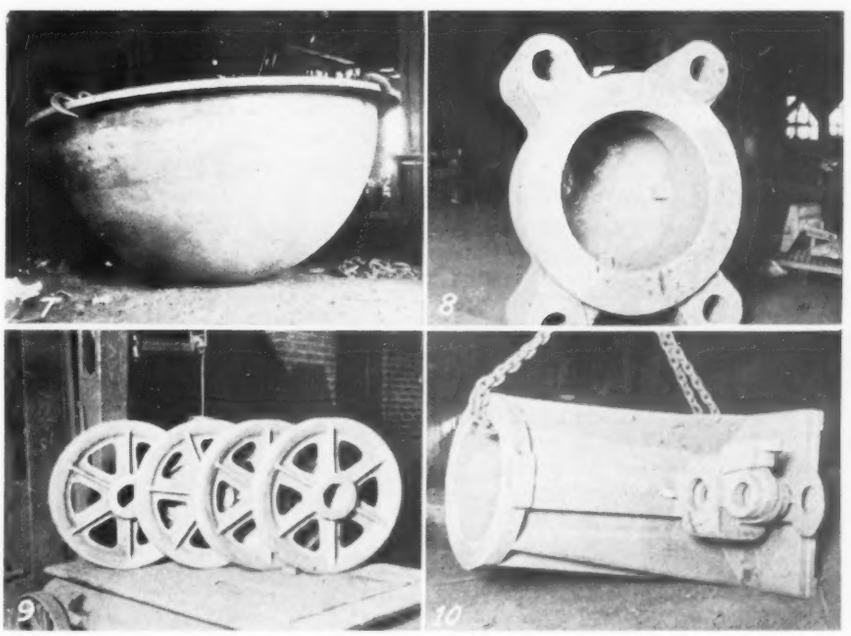
Electrical insulation will comprise a comprehensive exhibit designed to show the reduction of power and maintenance costs, and improved safety conditions, resulting from intelligent testing, accurate measurement, and continous control of plant electrical insulation.

Steel and alloys will be the theme of some of the most interesting operating exhibits. These and the method of their production will be illustrated in conjunction with an exhibit of high strength alloys and carbon steel castings, also castings of stainless and heat resisting alloys. Small size electrically welded pipe and abrasive resisting plates will be shown.

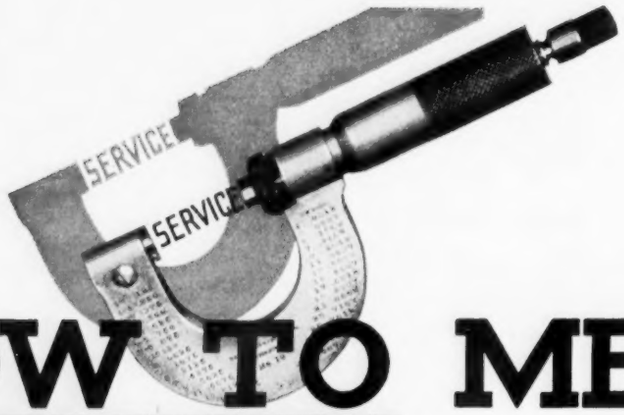
Tile and cast iron conduits which protect and insulate underground steam heating lines, superheated steam power, hot water, also brine lines, will emphasize the savings which are made possible by a completely engineered, ready-made, conduit system. Alignment guides, pipe rollers, and other conduit accessories will be shown in the same exhibit.

Industrial filters will include types for practically every plant purpose. Heavy duty motor driven cleaning filters will be featured, also power plant filters for handling lubricating and fuel oils. The materials handling section will include multiple lift trucks and ball bearing portable elevators.

Executive offices of the exposition are at the Grand Central Palace, New York, with Charles F. Roth again in charge.

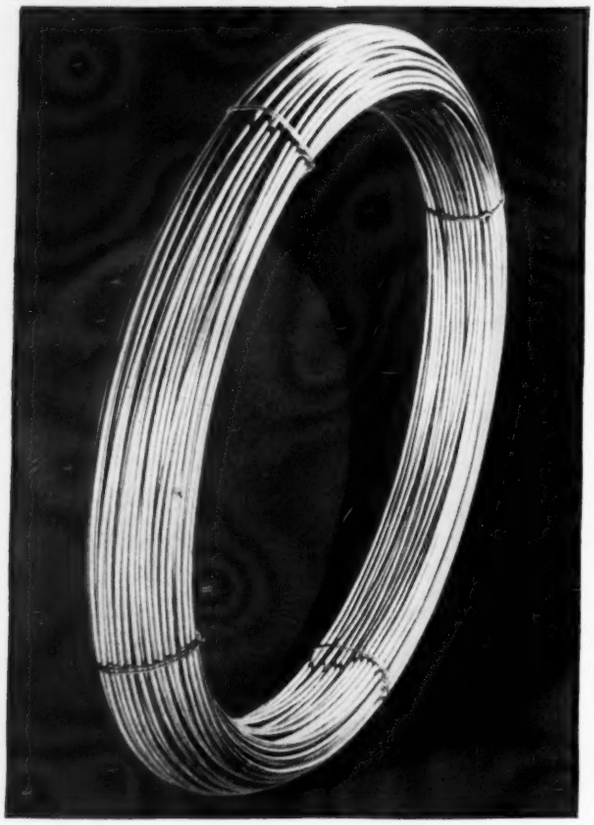


Lead refining pot (7), *50 tons capacity, operated continuously day and night from Sept.* 15, 1931, *to March* 17, 1934, *with metal held in cycles of* 900 *to* 1200 *degrees Fahr.; it was as-cast meehanite containing* 1.2 *per cent manganese. Hydraulic press cylinders* (8), *cable sheaves for clamshell bucket* (9) *and steam forging hammer cylinder* (10) *all are straight meehanite neither heat treated nor alloyed*



HOW TO MEASURE

AN ESSENTIAL WIRE VALUE



Premier Spring Wire, Weaving Wire, Pin Wire, Bolt, Rivet and Screw Wire, Broom and Brush Wire, Pinion Wire, Basic and Bessemer Screw Stock, Premier Tested Welding Wire, Flat Nut Stock, Hair Pin Wire, Mattress Wire, Music Spring Wire, Cold Finished Steel Bars, Pump Rod Bars, Wool Wire, Piano Wire and Wire Rods. Also U S S Stainless and Heat Resisting Wire.

HERE—at this source of supply—service to you begins with the care and attention given to every detail of manufacture—with every detail relating to specific problems. No matter how fine a wire may be made—unless it exactly performs the task allotted to it—unless it is unfailing in its ultimate service—it is not the correct wire. What is the wire to be used for—what are the manufacturing problems involved in its fabrication—what punishment must it withstand—these are questions directly related to service—and their answer depends upon the most careful supervision. To measure wire value—measure the service that its maker extends—his ability and willingness to work with you all the way from preliminary survey to finished product.

1831

1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

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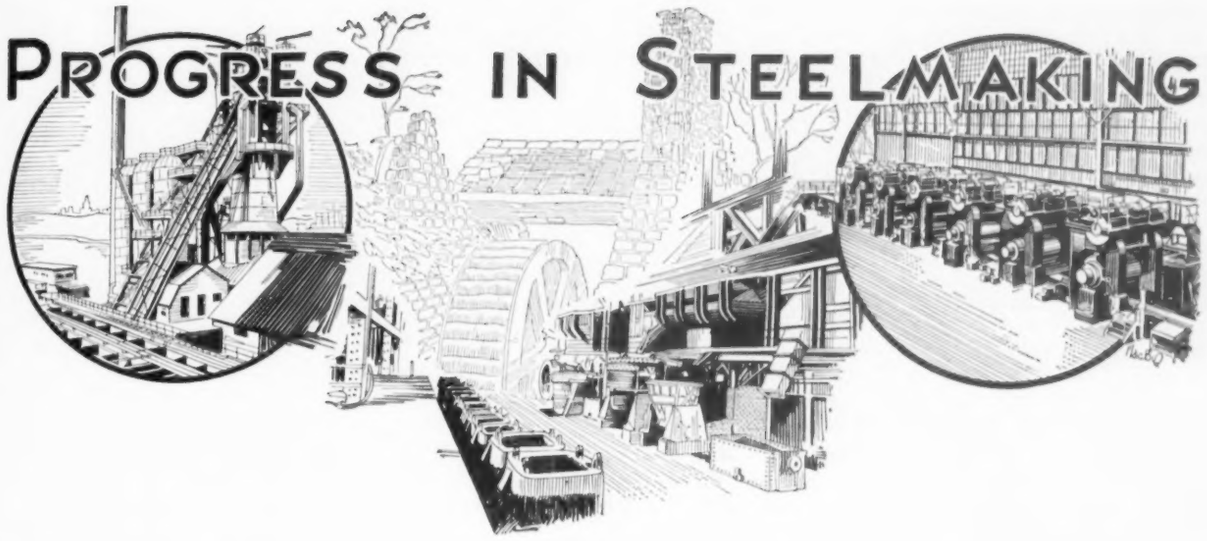
PROGRESS IN STEELMAKING



FAILURE of ingot molds by fire-cracking is a function of the growth of cast iron, according to a manufacturer of molds. The less the iron grows, the longer the mold life. Actual tests of molds under service conditions disclose that failure from this cause can be reduced materially if the combined carbon is maintained from 0.60 to 0.70 per cent.

• • •

EMPLOYS ELECTRIC DEVICE

Photronic equipment is employed at an Ohio tube mill to assist the roller whose view of the discharge end of the heating furnace is obstructed. When a tube is delivered from this furnace it causes a photronic control to light, thus notifying the roller that the tube is clear of the furnace and that the door may be closed.

• • •

AIR CARRIES TEST SAMPLES

Pneumatic tubes are employed by an Ohio steelmaker for transporting samples of steel from the steelmaking department to the chemical laboratory. To avoid any inaccuracy or misunderstanding the recorder's office and laboratory are connected by a telautograph system. When the preliminary analysis of open-hearth heats are completed as well as the final determinations of electric furnace heats the results are transmitted over the telautograph system to the respective steelmaking shops.

• • •

HOW FLOORS ARE PROTECTED

To afford protection to the floors in the pickling department and to the exterior of the pickling tubs as well, an Illinois wire rod fabricator has his acids vats built with an overflow pipe about 8 inches from the rim. The pipe connects with a receiving tank rather than with a sewer, the overflow being returned to the tub instead of being wasted, thus minimizing the loss of acid.

• • •

REMOVABLE COIL PROVIDED

Improvements have been incorporated in lifting magnets for steelworks use. These involve the use of a strip copper coil 12½ per cent heavier and a new center pole shoe which can be removed and replaced without disturbing any other parts of the magnet. Because of the increased weight of copper the magnet

has greater all-day lifting capacity and will operate cooler. The controller is built with indestructible arc shield and an arc suppressor which not only reduce arcing but rapidly reduce the current flow to zero. By this arrangement quick release of the load from the magnet is assured.

• • •

BUILDS LARGE ORE CRUSHER

Iron ore will be reduced to furnace charging sizes at a plant in England by a new roll-type crusher weighing 130 tons. The machine will be used as a sledger or primary crusher, the product being passed to a secondary crusher for further reduction. The energy of the rotating rolls, after the power is shut off, is sufficient to crush from 20 to 30 tons of ore before the machine is brought to rest. The rolls, driven by separate motors at 160 to 200 revolutions per minute, are 6 feet diameter and 5 feet long and with their shafts weigh about 30 tons each. The renewable crushing roll shells are studded with conical-shaped teeth. One roll has two rows of heavy "slugger" teeth which strike and break up the larger pieces of ore. The crusher is designed to take blocks of iron ore 54 x 48 x 36 inches and to crush 500 tons of ore an hour.

• • •

IMPROVES SIGNAL SYSTEMS

One of the advantages of a new calling device for iron and steel plants is that it can be used on any kind of a signal system employing horns, bells, sirens, etc. for code calling. Located at a switchboard and connected into the signal system the device provides 30 separate codes to call any of 30 different people. The operation consists of setting a dial and pushing down a plunger, each code being repeated three times automatically.

• • •

RECLAIMS STOCK FLUE DUST

More attention is being paid to the sintering of stock flue dust for blast furnace consumption. At a plant in the Great Lakes district about 350,000 tons of sludge has been dredged from the lake, this being sintered with the daily production of flue dust and used in the burden with satisfactory results, according to the superintendent. Other plants have used sinter produced from a mixture of stock flue dust, Mesabi ore screenings and current dust as high as 100 per cent of the burden with good results.

Study of Energy Transformation and Heat Dissipation by the Steel Mill Worker

BY D. B. DILL
Harvard University

The author, D. B. Dill, who is associated with the fatigue laboratory, Morgan hall, Harvard university, Cambridge, Mass.

WELFARE of the worker is no longer considered merely the affair of the individual himself. Industry recognizes that it must assume a share of responsibility for accidents and provide medical care for those injured or incapacitated in line of duty. It also recognizes that prevention is paramount in importance to treatment. The preventive and therapeutic measures which have been adopted are familiar enough and their value to employer and employe is proved by the decreasing number of sick days per man.

In one field, however, progress in prevention and cure has been equally backward. This field is that of heat cramps. As long ago as 1904 Dr. D. L. Edsall, now dean of the Harvard medical school, studied cases of heat cramps in steel workers in the Pittsburgh area. Since then few studies have been made either in Europe or in this country. There still remains a difference of opinion regarding methods of prevention as well as methods of treatment of this condition.

Laboratory and Field Studies

The interest of our laboratory in the effects of high temperature on physical activity has extended over a period of four years. During that time we have conducted many laboratory studies and two field studies, one in the Panama Canal Zone and another at the Boulder dam. After these experiences with the subject we were invited by the Youngstown Hospital association, Youngstown, O., to undertake a study of heat cases in the Youngstown area during the summer of 1934. The local expenses of this investigation have been borne by the Youngstown Sheet & Tube Co., the Republic Steel Corp. and the Sharon Steel Hoop Co. The Youngstown Hospital association has provided at its north side unit excellent facilities including an eight-bed ward, an interne, private nurses, a dietitian, a technician and an adequately equipped chemical laboratory.

The studies we have made at Youngstown lie in two categories. Dr. J. H. Talbott has had charge of the diagnosis and treatment of cases. The other members of the party have made observations in the mills on normal men at work and have studied preventive measures. Besides these studies at Youngstown, work is under way at the Harvard fatigue laboratory to determine more precisely the physiological changes responsible for heat cramps. Since full reports of these studies cannot be made for some time it seems advisable to present a brief account of our progress to date.

Body Transforms Food Fuel

The human organism may be regarded as a machine to which energy is supplied in the form of protein, carbohydrate and fat. These fuels undergo some transformation during digestion and a moderate reserve of carbohydrate and a large reserve of fat are deposited for energy requirements. In the production of mechanical energy, i.e., when the man is at work, fat and carbohydrate are used by the muscles in variable proportions, the proportion depending on the intensity of the work, on the nature of the diet, on the progress of digestion and on the amount of carbohydrate in reserve. Since the transformation of these reserves of chemical energy to mechanical energy is only 20-25 per cent efficient, the remainder appearing as heat, a mechanism must be provided for heat dissipation.

The hard physical work done by the steel mill worker calls for the daily transformation of perhaps twice as much energy as in the average individual. It has been supposed that the phenomenon of heat cramps is in some way related to the large turnover of carbohydrate in such activity. On the assumption that serious carbohydrate depletion may be involved, glucose is sometimes supplied in dispensers to workmen and intravenous glucose is employed in the hospital as a therapeutic measure. The facts do not support this hypothesis. Thus we find the concentration of blood sugar is normal whether the man is at work or suffering from heat cramps. Furthermore the administration of adrenalin to a workman suffering from heat cramps resulted in a normal increase in blood sugar, indicating a normal carbohydrate reserve, and did not relieve his cramps.

Normal Demand on Reserves

As a matter of fact there is reason for thinking that in the steel worker the usual proportion of carbohydrate is oxidized. Laboratory studies indicate that the ratio of carbohydrate oxidized is the same whether work is carried out in a comfortable environment or in a temperature and humidity which bring on exhaustion in an hour or less. The body becomes prodigal with its reserve of carbohydrate only when the rate of energy production is increased to a level high enough to tax the oxygen transport mechanism. Under such conditions, lactic acid, an unoxidized intermediate in carbohydrate metabolism, is present in increased concentration in the blood. However our analyses of blood from normal men at work in steel mills show no increase in lactic acid. This may be interpreted as evidence that no unusual demand is made on carbohydrate reserves in the steel worker.

As suggested above, when muscular activity is carried on in a hot environment a special mechanism for heat dissipation is called into play. This involves the diversion of heated blood from its channel through the muscles where work is performed to the skin, the associated excretion of sweat and the cooling of the blood by evaporation of sweat. Blood serving this function is immobilized

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insofar as supply of oxygen and removal of carbon dioxide are concerned. In other words, as the external environment becomes more unfavorable for heat dissipation the volume of blood circulated to the skin increases.

If work is to continue at the same rate, the volume of blood circulated to the active muscles remains constant. The burden for the heart may become too great, and there may follow circulatory failure as revealed by blood pressure and pulse changes. Such a breakdown may occur long before there has been much sweating; it is likely that many of the heat deaths reported in the Middle West this summer were of this sort. In this connection Dr. P. H. Kennedy, medical director of the Youngstown Sheet & Tube Co., has studied the incidence of heat cases among men he has examined. He concludes that young men with low blood pressure and poor cardiac reserve, even though they may appear husky, cannot stand hot, strenuous work.

Loss of Salt a Factor

An individual tough enough to carry on his job in the steel mill is less apt than the average individual to have a circulatory defect, and in him a breakdown of quite a different sort may occur. The circulation can be maintained, heat can be dissipated and body temperature controlled. This may involve the formation during an eight-hour turn of from three to ten quarts of sweat—sometimes even more. Analyses show that not less than one-third ounce and in some individuals more than one ounce of salt may be lost when the excretion is at a maximum. This subjects the body to a hazard for which nature has no adequate provision. In the absence of sweating the salt intake far exceeds daily requirements and the excess is eliminated with precision by the kidneys, leaving a concentration of chloride in the blood which rarely varies outside the limits of 0.103 to 0.108 molar. If the concentration falls below this level the kidneys are able to put out a chloride-free urine and so conserve the body's salt reserves.

Must Provide for Depletion

The sweat glands have no such power, however, but continue to put out salt, regardless of the extent of depletion. Nature has failed man not only in respect to a salt "valve" in the sweat glands but also in respect to an adequate warning signal when salt reserves get dangerously low. In other words no matter how great the salt depletion we have no great craving for salt such as that which some herbivorous animals evidently possess. The absence of this craving means that conscious provision must be made for increasing the salt intake when sweat loss is large.

If that provision is not made and if sweating and hard work continue, the worker develops heat cramps. The biochemical and clinical studies of these cases will be presented later; it is enough to say here that all cases so far studied respond promptly to intravenous administration of 0.9 per cent salt solution. There is no question in our minds that the condition of heat cramps is a consequence, although perhaps not an immediate consequence, of salt depletion from heavy sweating.

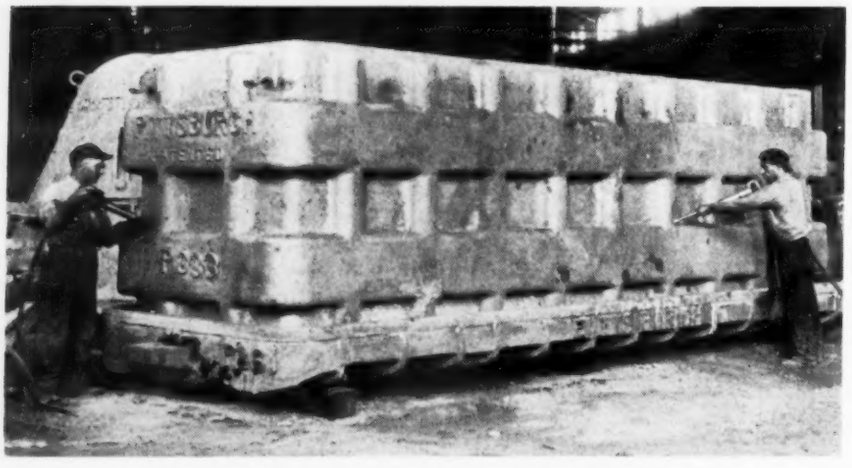
About one-half of the heat "cases" observed at Youngstown during the summer of 1934 were classified as heat cramps and probably could have been prevented by an adequate salt intake. Three methods of accomplishing this are available. One of these is to advise the heavy salting of food during the summer months and a second is to provide units for dispensing salt tablets at drinking fountains. Neither method is wholly effective on account of individual prejudices against the use of salt. Thus many cases of heat cramps came from mills where salt tablets were available; evidently some individuals had failed to use them.

We have tried adding salt to the drinking water with promising results. Water containing 0.1 per cent salt solution is palatable, satisfies thirst and probably contains enough salt to supplement adequately any diet. It remains only to carry out adequate experiments on a plant scale. These are now in progress under the supervision of Dr. Kennedy in two sheet mills of Sheet & Tube.

Cases Often Not Reported

A few points should be emphasized in conclusion. Many heat cases in steel mills and most of those observed in cities in hot "spells" have nothing to do with salt supply and can be attributed to mechanisms of other types. On the other hand the importance of the phenomenon of heat cramps is greater than is indicated by the number of cases reaching the hospital. Inquiry among steel workers, particularly those employed in the sheet mill and blooming mill, reveals that cramps, generally mild and of short duration, are quite common; one man stated that he supposed that 90 per cent of workers in the sheet mill had experienced them. They occur frequently after reaching home and thus may never be reported to the company physician. Apparently many men are reticent about reporting them because of fear of being transferred to a less desirable job.

In addition to increasing the salt intake in hot weather there are other preventive measures which experience has proved important. Men are urged to avoid recreations and occupations outside working hours, especially just preceding working days, that cause sweating. Periodic physical examinations are advised in order to obtain the proper men for hot, strenuous work. Overindulgence in strong liquor is a predisposing factor particularly if salt is lost because of vomiting and salt intake is diminished because of loss of appetite.



COMPLETES ORDER FOR LARGE ANNEALING BOXES: Twelve of these large annealing boxes recently were ordered by Wheeling Steel Corp. Each has a capacity of 90,000 pounds of tin plate. The box itself is made of a combination of welded plates and castings, according to a design by Vice President C. W. Howatt of the Pittsburgh Steel Foundry Corp. The annealing boxes, which have been shipped to Wheeling Steel's Steubenville, O., works, are being used in conjunction with annealing the products of the new cold-rolled tin mill at this plant. The illustration shows workmen putting finishing touches on one of the 12 boxes at the Glassport, Pa., works of Pittsburgh Steel Foundry Corp.

Booklet Reviews Gas Cutting

"Recommended Practices for Gas Cutting of Structural Steel" is the title of a new 16-page booklet issued by the Linde Air Products Co., New York. It includes chapters containing definitions, general recommendations, qualifications for workmanship, safety precautions, etc.

St. Nicholas central breaker of Philadelphia & Reading Coal & Iron Co., near Shenandoah, Pa. In this plant anthracite coal of all sizes is separated from slate and shale in hoppers or cones made of abrasion resisting plate

Special Steel Developed for Wear-Resisting Service

BY EDWIN F. CONE

IN SEVERAL lines of industry, as in the handling of coal, sand and gravel, there is a demand for a low-priced steel in the form of plates, sheets, bars, etc., which will resist abrasion or wear to a greater extent than will plain carbon steel. Such a steel must be hard and tough, possessing at the same time as much ductility as its hardness will permit. It must also be capable of being bent and machined. It is of course realized that such a steel, because of its hardness and toughness, cannot be fabricated as easily and to the same extent as ordinary soft or tank steel.

A steel which meets these conditions has been placed on the market by the Bethlehem Steel Co., Bethlehem, Pa. It has been designated as Bethlehem abrasive resisting steel. The object of this article is to present some of the properties and uses of this steel which already have been received with favor.

Brittleness Is Avoided

This special steel is a carbon-manganese-silicon grade. It is an open-hearth steel produced under careful metallurgical control. The percentage of hardening elements is high but there are present also enough toughening constituents to offset the brittleness imparted by the high carbon. But the important considerations are its physical properties and its degree of hardness.

Tensile strength of this steel in the as-rolled condition has an approximate range of 115,000 to 130,000 pounds per square inch. Minimum brinell hardness is about 235 as compared with a maximum of about 126 for ordinary tank quality steel. By varying the composition to suit the application, the brinell hardness can be run up to approximately 300.

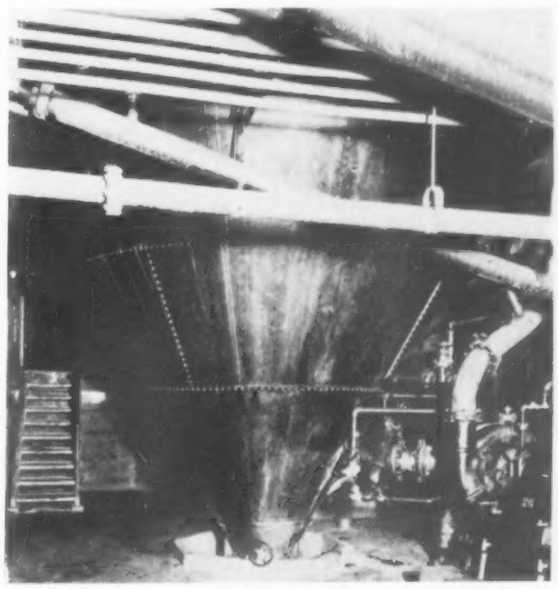
In fabrication greater care must be employed than with the ordinary plate steel, but these difficulties are by no means a barrier to its successful use because it can be fabricated in the average shop, with the usual shop tools and equipment. The relatively small extra cost is many times compensated for by its longer life—so much so that this steel compares favorably with many of the high cost alloy steels which sell at from 15 to 35 cents per pound, and in many cases it can be used with equal success. In this respect it enjoys a distinct price advantage.

This special steel is available both as plates and bars. It can be furnished in the usual sheared and universal plate mill sizes, No. 10 gage and up, and as No. 8 gage up to 84 inches wide as well as No. 10 gage up to 72 inches wide. The conventional bar sizes are produced.

Precautions in Gas Cutting

In fabricating it can be shear cut up to $\frac{5}{8}$-inch inclusive only. All cuts in gages over $\frac{5}{8}$-inch and all circles and radius cuts should be machined to size. Gas cutting of this steel results in some difficulties but these can be overcome easily. Because of the high heat of the flame and the metal's hardness, there is a tendency toward oxidation at point-of-flame contact and for the plate to crack and check slightly along the burned edge. Where gas cutting is necessary in order to obtain full size dimensions, it is suggested that at least $\frac{3}{4}$-inch be allowed on each side and then machine cut inside the burned edge; or, the cracking due to gas cutting can be eliminated by heating the material to several hundred degrees Fahr., cutting while warm and then cooling slowly.

This abrasive resisting steel can be bent in light gages, No. 10 to $\frac{3}{8}$-inch, if a reasonable radius is employed, to 90 degrees without fracture when carefully handled. When the working is more difficult and where heavier gages are involved, this steel should be heated to several hundred degrees Fahr., bent to size



THIS equipment is known as a Chance cone, used for separating anthracite coal from slate, sand and other impurities. The cone is built of abrasion resisting steel plate

8 REASONS for the Use of Medium Carbon Ferromanganese

In the production of low carbon steels the use of Medium Carbon Ferromanganese will simplify your practice and reduce costs. The reasons:

1 It is unnecessary to oxidize the carbon in the bath to as low a percentage as when higher carbon alloys are used.

2 Oxidation of the bath lowers the yield from charged to ingot or casting weight.

3 Refractory costs of both furnace and ladle are substantially lower.

4 Furnace time is decreased.

5 Recovery of manganese is appreciably higher.

6 The deoxidizing influence is stronger due to the presence of a small amount of silicon and the lower percentage of iron.

7 The low carbon content of the alloy inhibits the formation and segregation of hard manganese carbides in the finished steel.

8 Economic advantages more than offset the small additional expense.

A thorough understanding of the operator's problems by Electro Metallurgical engineers has developed increasing uses for this alloy. Their service on steel melting practice may be helpful to you. Write for further information.

CHROMIUM

High Carbon Ferrochrome (maximum 6% carbon)
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

SILICON

Ferrosilicon 15% Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 85%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% Silicon)
Calcium Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon
Silicon-Copper
Miscellaneous Silicon Alloys

BRIQUETS
(Patented)
Chrome Briquets Silicon Briquets
Manganese Briquets

TUNGSTEN

MANGANESE

Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys
Spiegeleisen

SILICO-MANGANESE

All grades including Silico-Spiegel

VANADIUM

All Grades

ZIRCONIUM

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12 to 15% Zirconium
Zirconium-Manganese-Silicon

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and then cooled slowly. It is recommended that all holes be drilled, not punched.

Welding of this steel is accomplished readily, but not while it is extremely cold. After welding, normalizing of the whole section is recommended—that is, immediately after welding, the entire piece should be heated to about 1550 degrees Fahr. and cooled slowly in air. This heat treatment can be dispensed with if the welded portion is not subject to severe vibration and stresses. Normalizing has the advantage that it will prevent cracks, insure uniform structure and not harm the abrasive resisting properties.

This steel responds to heat treatment, with resultant properties approximately as shown in the accompanying table.

Physical Properties of Abrasion-Resisting Steel

Oil quenched at 1550 degrees Fahr. and drawn to 800 degrees Fahr.	
Tensile strength, pounds per square inch	130,000
Elastic limit, pounds per square inch	102,000
Reduction of area, per cent	51.0
Elongation in 2 inches, per cent	15.0
Water quenched at 1550 degrees Fahr. and drawn to 800 degrees Fahr.	
Tensile strength, pounds per square inch	180,000
Elastic limit, pounds per square inch	168,000
Reduction of area, per cent	53.0
Elongation in 2 inches, per cent	15.0
Quenched in oil from 1550 degrees Fahr. and drawn to 1200 degrees Fahr.	
Tensile strength, pounds per square inch	100,000
Elastic limit, pounds per square inch	74,000
Reduction of area, per cent	62.9
Elongation in 2 inches, per cent	26.6

Composition Varied To Suit

Composition of this steel must be suited to its applications. If bending or forming is necessary, the brinell hardness should be preferably on the low side. It would still have maximum ductility and be high in abrasive resistance. On the other hand if forming is not necessary and if machining or drilling only are involved, the brinell hardness may be near the maximum, resulting in maximum abrasive resistance.

Some of the uses to which this special grade of steel has been put include: Scraper blades, conveyors, loaders, mixers, spouts, hoppers, shovels, dredge pipe, dredge pump liners and chutes for sand, gravel and coal.

Testimony from consumers regarding their experience with this steel is interesting. Some of this testimony follows.

A company which operates a gravel pit states that it placed two sheets of abrasive resisting steel, 5/16-inch thick, in the top of an elevator for use as baffle plates. At least 50,000 tons of material have passed over this steel which, at the time of the inspections, had not shown any wear. The company states that it expected that the steel would handle an additional 75,000 tons without replacing. In order to handle the same amount of material, about 125,000 tons, over common steel plate, it is estimated that this would have had to have been replaced at least five times.

Another company handling similar material states that it installed in its apparatus chutes made of this steel and that, at the time of the report, none of it had been replaced. The company estimates that ¼-inch abrasive resisting plate gives about three times the service formerly obtained from the ⅜-inch tank plates.

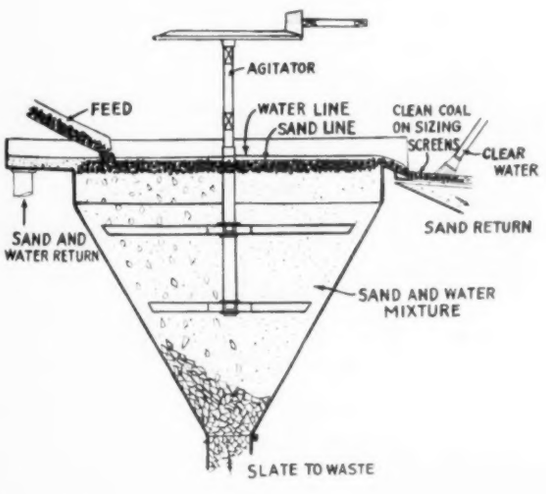
Withstands Severe Service

Installed in the gravel chutes of a company where the entire wear is a sliding one without any pounding effect, this anti-wear steel has proved satisfactory, according to another company, which also states that the steel has been used as a scrubber shell where the wear is both a sliding and a pounding action. Under these conditions the plates have shown less wear than common or ordinary steel.

Another recent installation of this steel which is of decided interest, is in the St. Nicholas breaker of the Philadelphia & Reading Coal & Iron Co., near Shenandoah, Pa.

In this colliery about 40 tons of the Bethlehem abrasion resisting steel plate have been incorporated in the Chance cones or hoppers which clean slate and other impurities out of Reading anthracite before it is sent to market. Accompanying illustrations show that the plates is constantly in contact with sand, coal and slate and the wearing action is considerable. This plant has been operating nearly two years, during which millions of tons of coal have been processed, and the plate has given excellent satisfaction.

When the conditions which such a steel must meet are fully known and when the material to meet these conditions is properly selected, it is stated, the result is a considerable saving in the cost of maintenance of equipment which handles abrasive materials.



◆

PURE coal is lighter than the agitated mixture of sand and water in the cone, while slate and bone are heavier. The coal floats and is washed over the lip of the cone while the impurities sink and are washed out through the bottom

◆

New Bulletins Discuss Effects of Deoxidation

Four new bulletins on the effects of deoxidation on various physical properties of steels have been issued under the auspices of the Carnegie Institute of Technology and the Mining and Metallurgical Advisory boards, Pittsburgh, and can be obtained from John D. Beatty, secretary, Carnegie Institute of Technology, Pittsburgh, at 50 cents each. Bulletin No. 64 by C. H. Herty Jr., M. W. Lightner and D. L. McBride, comprises 40 pages devoted to "The Effect of Deoxidation in the Rate of Ferrite Formation in Plain Carbon Steels."

Bulletin No. 65 by C. H. Herty Jr., D. L. McBride and S. O. Hough, contains 56 pages on "The Effect Of Deoxidation on Grain Size and Grain Growth in Plain Carbon Steels."

Bulletin No. 66 by C. H. Herty Jr. and B. N. Daniloff, contains 52 pages on "The Effect of Deoxidation on the Aging of Mild Steels."

Bulletin No. 67 by C. H. Herty Jr. and D. L. McBride, contains 52 pages on "Effect of Deoxidation on the Impact Strength of Carbon Steels at Low Temperatures."

18-8 Chrome-Nickel Steels Tough at High Temperatures

AUSTENITIC steels of the general 18-8 type have been described erroneously as becoming brittle at elevated temperatures. As a matter of fact, such steels remain extremely tough when hot and are fully capable of resisting sudden shocks or stresses under severe conditions. Heating such steels in the carbide precipitation range may cause a reduction of impact strength through precipitation or structural alteration, but, in most cases, the impact strength remaining is substantial, especially in alloys of low-carbon content. Most of the determinations of impact resistance have been made cold after heating, but a few tests show excellent values at elevated temperatures.

The foregoing statements were made by H. D. Newell, chief metallurgist, Babcock & Wilcox Tube Co., Beaver Falls, Pa., in a paper on the ductility of chromium-nickel austenitic steels at elevated temperatures presented before a research session at the annual convention of the American Society for Metals in New York, Oct. 1-5.

Under static loading, the austenitic steels are hot short and exhibit reduced ductility in the general temperature range 1000 to 1800 degrees Fahr., continued Mr. Newell. Lester has described this condition and has attributed it to formation of ferrite and precipitation of carbides along atomic planes in grains that would normally be favorable to slip. The lack of ductility or hot-shortness manifests itself under tensional deformation in the form of intergranular fracture with adjacent intergranular cracks.

Causes Trouble in Fabricating

In a practical sense, this lack of ductility has caused difficulties in certain fabricating operations, such for example as tube bending and expanding or plate bending. It has also caused unfavorable comment in the refining industry because 18-8 tubes do not give warning of impending failure by bulging when overheated. The condition has been alleviated by the user in correct cracking furnace design and careful operating practice, so that such failures now are a rarity. The shortcomings of the alloy, so far as ductility is concerned, are well known.

Feeling that any enhancement of elevated temperature ductile properties would be welcomed, the author made a study of a number of experimental and commercial alloy steels. Alteration of usual composition and additions of moderate amounts of special elements were made and the resulting alloys were subjected to short-time tensile tests at temperatures extending into the reduced ductility range. The short-time tensile test was used in preference to the slow bend test because of its convenience and greater ease of interpretation of results. Elongation and reduction of area measurements were taken as the criteria of ductility and strength values were obtained as a matter of course. In addition to the steels mentioned, ingot iron, a pearlitic steel and an alpha-delta steel were tested for comparative purposes.

Certain ambiguities exist in the action of the various addition agents, making is difficult to draw any sharply defined conclusions. However, Mr. Newell made the following generalizations:

Confirms Earlier Research

Sauveur's statement that gamma iron is stronger and less ductile than alpha iron is readily confirmed. It is held that gamma iron is inherently less ductile than alpha iron at intermediate elevated temperatures. Several factors apparently affect the ultimate ductility of chromium-nickel austenite; namely, formation of ferrite, deoxidation effects produced by the addition element, grain refinement produced by the addition element, and effect of addition element on carbide solubility and distribution (stability).

Addition elements tending to form ferrite show a tendency to improve hot ductility, but not to the same extent. Those elements having deoxidation power and grain refining action are more potent than those which simply form ferrite and stiffen the matrix. On the other hand, silicon promotes increased ductility at the higher temperatures in the absence of ferrite.

Titanium increases ductility possibly first through deoxidation and grain refinement and finally through ferrite formation. A similar trend is shown for molybdenum and to a much lesser extent for vanadium. Columbium, in spite of its similar action to titanium in preventing intercrystalline corrosion effects, does not improve ductility. Conversely, reduction of nickel content, to the extent that ferrite is formed, improves ductility.

In conclusion, Mr. Newell stated that the production of a general purpose austenitic steel with intermediate elevated temperature ductility approaching that of alpha iron, seems improbable.

By way of discussion of this paper, Russell Franks, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y., said it would have been well had additional tests been made on typical steels at higher temperatures, because usually initial temperatures above 1700 degrees Fahr. are employed for many fabricating operations. If this had been done, temperature ranges giving the best results for both types of operations might have been established.

Cites Conflicting Data

Mr. Franks differed with Mr. Newell in the contention that columbium impairs the ductility of the steels at elevated temperatures, while titanium improves this property. He submitted data on Izod impact tests at room temperature which showed that steels containing columbium have high ductility. His comment was that it was unfortunate that Mr. Newell did not include in his tests a steel of somewhat lower columbium content.

IN a paper presented before the annual meeting of the American Society for Steel Treating in 1932, Clair Upthegrove and D. W. Murphy, University of Michigan, Ann Arbor, Mich., gave data on the scaling of S.A.E. 1020 steel in atmospheres of air, oxygen, steam and carbon dioxide. They reported unexpected deviation in the temperature curves for both oxygen and air between 1800 and 2000 degrees Fahr., and pointed out that these deviations were accompanied by the formation of blisters on the surface of the steel.

To further investigate these phenomena by a study of the effect of temperature, time and partial pressure of oxygen in the scaling atmosphere in the temperature region 1650 to 2100 degrees Fahr., C. A. Siebert, metal products division, U. S. Rubber Co., Detroit, and Mr. Upthegrove undertook an investigation and reported upon it at the 1934 convention. Results are as follows:

1. A reversal, that is, a decrease in the amount of scaling with increasing temperature occurs from very low oxygen concentrations to 100 per cent oxygen in the temperature range 1850 to 2000 degrees Fahr.

2. The ferrous iron content of the scales formed undergoes a similar reversal, maximum and minimum occuring under approximately the same conditions as for the occurrence of the maximum and minimum for scaling.

3. The reversal occurs for all periods of time up to 6 hours, the maximum time period used. For a

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13 per cent oxygen atmosphere the extent of the reversal was increasing with increasing time at the end of 4 hours.

4. The effect of increasing time on scaling in atmospheres of oxygen, air, and 13 per cent oxygen is in general the same regardless of whether or not the temperature is one at which the scaling is continously increasing with increasing temperatures or one at which the reverse conditions exist. The 100 per cent oxygen atmosphere shows the least retardation in scaling as the time increases.

5. For those temperatures which show the greatest retardation in the rate of scaling with increase in time, the ferrous iron content of the scale is found to decrease. For those temperatures which show a less marked falling off in scaling the ferrous iron content of the scale is found to increase with time.

6. For certain oxygen concentratios the scaling losses and the ferrous iron content of the scale may remain practically constant over a given range of temperature, that is, retardation of scaling with increasing temperature may occur without a change in the degree of oxidation.

7. The change in the degree of oxidation causes a change in the membrane structure resulting in an increasing proportion of Fe_3O_4 solid solution in the temperature region where the reversal occurs.

8. The Fe_3O_4 solid solution has the lowest solid solubility range of the phases possible in the scaling system. This solid solubility is a limiting factor governing the concentration gradient or driving potential in the diffusional process. This, in turn, directly influences the rate of diffusion, the lower the driving force the lower the rate of diffusion, all other things being equal.

9. The membrane structure has a direct influence on the magnitude of the diffusivity coefficient. If the changes in the membrane structure in the region of the reversal are of such a nature that an increase in the diffusivity coefficient results, then the effect of the lower oxygen solubility in the Fe_3O_4 solid solution must be so great that it will overcome the effect of increasing the coefficient of diffusion. On the other hand, if the change in membrane structure causes a decrease in the magnitude of the diffusivity coefficient, it will be one of the contributing factors in the reversal in the temperature-loss in weight curve.

Heat Treating in Controlled Atmosphere Furnaces

DURING the past few years, considerable attention has been given to various aspects of controlled atmosphere heat treatment. One paper presented at a research session at the annual convention of the American Society for Metals in New York, Oct. 1-5, dealt extensively with this subject. This paper, entitled "Heat Treatment in Controlled Atmospheres Including Gaseous Carburizing," and prepared by C. R. Austin, Penn State college, State College, Pa., contained a general discussion of the application of batch-type annealing or continuous normalizing to low-carbon steel, stainless steel, copper, brass and silicon steel. Attention was drawn to the more important fundamentals which must be considered.

The author also discussed the annealing of high carbon steels in carbon-bearing gases, stressing the relative importance of such factors as carbon concentration in the atmosphere; time diffusion, or conveying of carbide away from the gas-metal interface; and diffusion of carburizing gases into the metal. The need for correlation with the A_{cm} line of the equilibrium diagram was emphasized.

The usual purpose of a controlled atmosphere during a heat treatment cycle is to protect the surface of the metal so that it shall remain unoxidized, said Mr. Austin. Frequently, it is required also that the surface shall be cleaned free from color resulting from preoxidation of the metal, occurring during an earlier stage in fabrication. This applied to low-carbon steel such as tinplate and automobile body sheet, stainless steels, copper and brass, where considerable economy can be effected by the partial or complete elimination of the operation involving the pickling bath.

In annealing high-carbon steel, such as razor blade stock, file blades and hacksaw material, it is desirable to keep the surface free from oxidation to prevent surface decarburization, and even perhaps to supply carbon to the surface of the steel if partial decarburization has occurred during hot rolling, or other shaping operations. The bright anneal of stainless steel is a problem of considerable difficulty and may be extremely hard to realize commercially.

Electrical sheet or silicon steel, continued Mr. Austin, also presents a field for application of the principles of bright annealing, but here the problem relates rather to the reduction of oxygen and carbon content of the alloy and to the elimination of strain than to the production of a bright sheet or punching. A smooth surface finish is desirable however.

Much thought has been given to the bright anneal of tinplate particularly with a view to elimination of one or more of the pickling operations. A peculiar feature attaches to this problem, however, since the tinplate manufacturer is concerned with the familiar patterns found on tinplate when stripped from the pack. Much of this pattern, including the speckling known in the trade as eggshell pattern, is removed by pickling, but it tends to persist if the sheet is subjected to a bright anneal whereby the oxidized portions of the sheet are reduced to metallic iron.

Preoxidation Is Tried

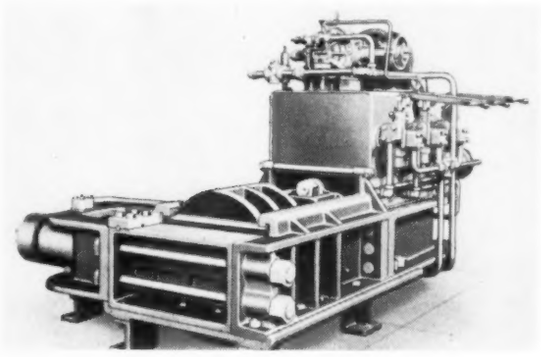
This, stated Mr. Austin, is a real problem confronting the application of bright anneal to the latter stages of tinplate manufacture where the surface appearance of the tinned product is of paramount importance. Preoxidation of the complete sheet prior to bright annealing, in an effort to eliminate the surface patterns, has been attended with moderate success.

Stainless steels contain varying amounts of chromium which renders the true bright anneal extremely difficult in commercial practice. It would seem, therefore, that true bright anneal is at present impracticable and that the fabrication of sheet with a lustrous finish must depend on the elimination of scaling by use of a reducing atmosphere during heat treatment followed by a suitable pickling operation to remove oxidation films causing the familiar discoloration of chromium alloys. Considerable care is necessary in pickling when a brilliant luster is desired, and a passivating action in nitric acid is used to prevent etching of the metal surface. It would appear, said the author, that use of a pickling process in which a slight lead deposit preserves the metal surface from attack might prove helpful in the processing of stainless steel.

INFLUENCE of oxide films on wear of steels was discussed in a paper by S. J. Rosenberg, associate metallurgist, and Louis Jordon, senior metallurgist, national bureau of standards, Washington. The effect of oxygen-free atmospheres (nitro-

(*Please turn to Page 60*)

Scrap Metal Baling Press — Hydraulic Press Mfg. Co., Mt. Gilead, O., recently developed a box-type scrap metal baling press which is completely self contained with its motor-driven H-P-M hydro-power unit mounted directly on the press at one end. The machine, shown herewith, consists of a box built up of massive ribbed steel castings to take the loose scrap metal. It is closed by a heavy sliding door, actuated by a hydraulic cylinder. Pressure is applied to the scrap from two directions, first from the end, and then from the side by platens moving into the box, operated by hydraulic rams. The application of the pressure is controlled through three lever actuated valves. Two pumps, each of the rotary high-speed oil pressure type, build up the pressure. The first pump delivers a large volume of oil at medium pressure; the second pump builds pressure up to maximum. An H-P-M control automatically regulates the pump's pressure and volume of output.



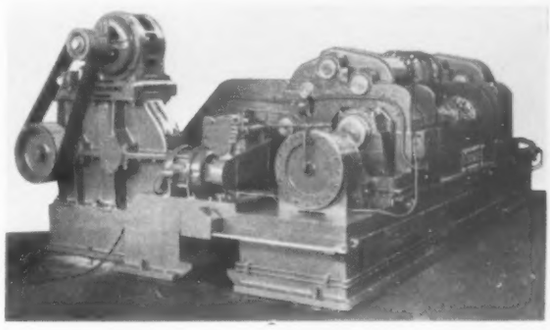
BOX-TYPE scrap metal baling press built by Hydraulic Press Mfg. Co. It incorporates the company's hydro-power principle of operation

Compactness, smooth action, speed of operation, ease of control and bales of high density are among the desirable features of this new scrap metal baler.

♦ ♦ ♦

Contour Turning Lathe—Wickes Bros., Saginaw, Mich., recently placed on the market a new contour turning lathe, shown herewith. This unit is used for simultaneously turning the contours on the twelve crankarms of a heavy six-throw seven line bearing crankshaft. The lathe first takes a heavy roughing cut, immediately followed by a fine finishing cut.

Support of the crankshaft is maintained on three center bearings by means of a roller rest. Due to the fact that the crankshaft is large and extremely hard, having a brinell hardness up to 385, the machine is built ruggedly throughout with a net weight of 62,000 pounds. Drive is effected by means of a 30-horsepower constant speed motor through a speed reducer. Separate motors are employed for the hydraulic pumps and cooling compound. A similar machine is used for simultaneously turning the twenty-four chamfers on the crankarms.

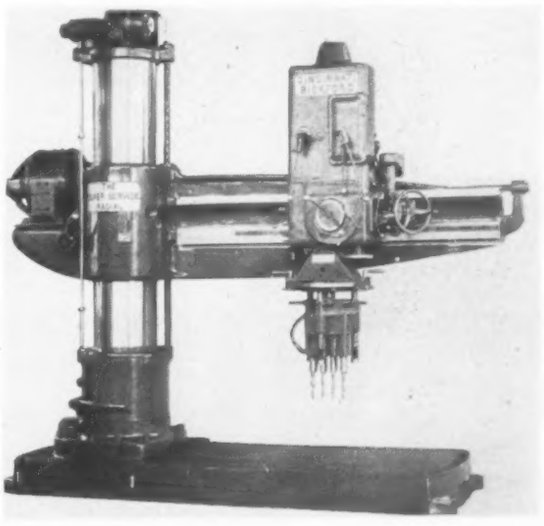


THE base of this Wickes contour turning lathe embodies welded steel construction, being built up of 1½ and 2-inch cross rolled steel plates. The unit is employed for simultaneously turning the contours on twelve crankarms of a heavy six-throw crankshaft

♦ ♦ ♦

Multiple Spindle Drill Heads — Cincinnati Bickford Tool Co., Oakley, Cincinnati, announces that recent developments have made more efficient the use of multiple spindle drill heads on radial drills. A patented self-counter-balancing mounting bracket has been perfected which provides rigid support, compensates for the weight of the drill head, and causes its quick return from the work. The multiple head and mounting bracket may be removed in a few minutes, thus quickly converting the machine to a standard single spindle radial drill.

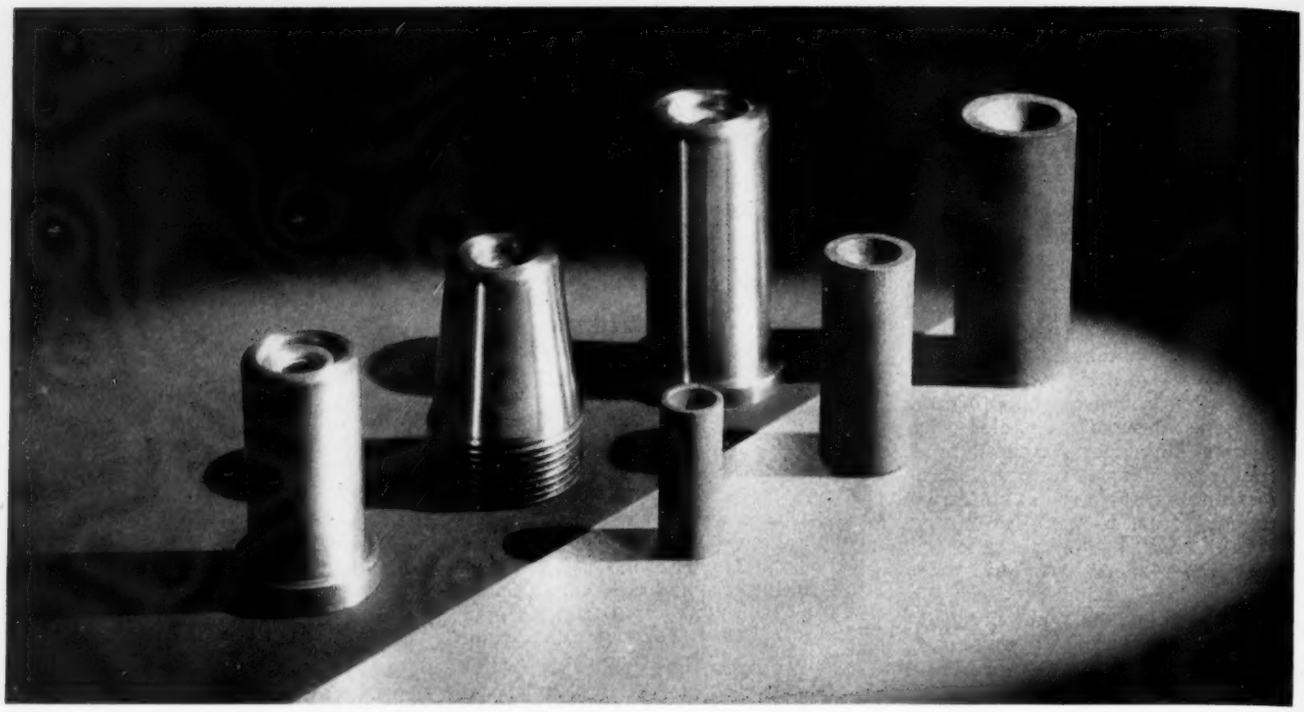
A 6-foot radial drill is equipped with a fixed center, ball bearing drill head to carry three 1¼-inch drills spaced on 2¾-inch centers, each spindle having vertical adjustment. The accompanying illustration shows a swivel type mounting which permits a complete circle rotary adjustment of the drill head. This particular ball bearing drill head carries four 1-inch drills spaced on 3-1/16-inch centers. Cutting lubricant is supplied to each drill by separate nozzles. This machine also may be converted to a standard 7-foot radial in the few minutes required to remove the drill head and mounting bracket. The drill head shown has the spindles in line but other types of drills heads are equally applicable.



CINCINNATI Bickford radial drill with fixed center drill head carrying four 1-inch drills on 3⅛-inch centers and having swivel type mounting

♦ ♦ ♦

Sanding, Polishing Machine—Sterling Products Co., Detroit and Los Angeles, is introducing a new sanding and polishing machine, shown herewith. It weighs 7 pounds, and operates on 70 pounds or more of compressed air, (using 6 cubic feet of air per minute), thus making it suitable for small shops as well as the



Announcing . . .

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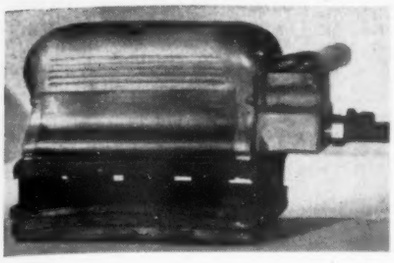


Sterling sander fulfills wide range of industrial requirements

heaviest production lines. The sanding motion of the device is an oscillating or reciprocating one. The stroke travel of the abrasive pad is 1¼ inches, at the rate of between 2500 and 3000 oscillations per minute. The pad moves back and forth with the same motion as in hand sanding, and it is claimed does not leave a graining or chasing in the surface.

Several sheets of abrasive may be attached to the pad at one loading, ordinary sheets are cut in three pieces without waste. A standard grade abrasive, with a coarser grit may be used than with hand sanding, an important factor in speed of production.

Due to its light weight, and small size, being 7¾ inches long, 4¾ inches high,and 3¾ inches wide, the sander can be used on all type of work for long periods of time without tiring the operator. For wet sanding, a water connection is provided with a series of openings on each side of the machine, allowing a spray easily adjusted to the need of the work.

♦ ♦ ♦

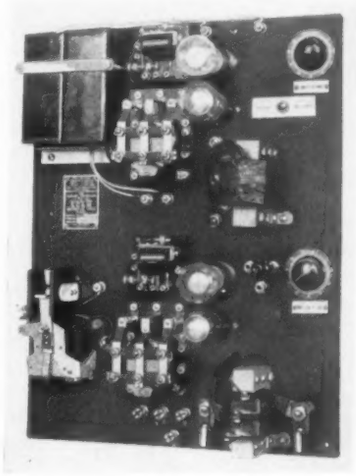
Welding Electrode—General Electric Co., Schenectady, N. Y., recently announced new heavily coated arc welding electrodes, designated as type W-23, for the economical production of high-speed, high-quality welds in the flat position. These electrodes are suitable for either manual or automatic arc welding and will produce equally good results on either alternating or direct current, it is claimed. With the latter, reverse-polarity is used.

Economy in the production of high-quality welds is effected by the ability of type W-23 electrodes to operate at higher speeds, in larger diameters (⅛, 5/16 and ⅜-inch), and at higher current values than those commonly in use. Another economy-promoting characteristic is the fact that the welds produced fuse uniformly with the side walls of the joint, thus saving the time and labor ordinarily spent in chipping out slag from pockets at the line of fusion.

Welds made with the new electrode are smooth and possess exceptional tensile strength, density, ductility and resistance to impact and corrosion. It is recommended for the fabrication of pressure vessels, pipe, machinery, and all types of joints where welding can be carried out in the flat position.

♦ ♦ ♦

Automatic Repeat Weld Timer — Electric Controller & Mfg. Co., 2702 East Seventy-ninth street, Cleveland, announces a new automatic repeat weld timer for use in connection with resistance welding machines in which the electrodes are air or motor operated. The welding period provided by this timer varies in inverse proportion to the rate of current flow, insuring the correct number of heat



New EC&M automatic repeat weld timer is introduced

units are put into each weld, while the "off-time" or period the electrodes are apart, is a definite length of time which is adjustable.

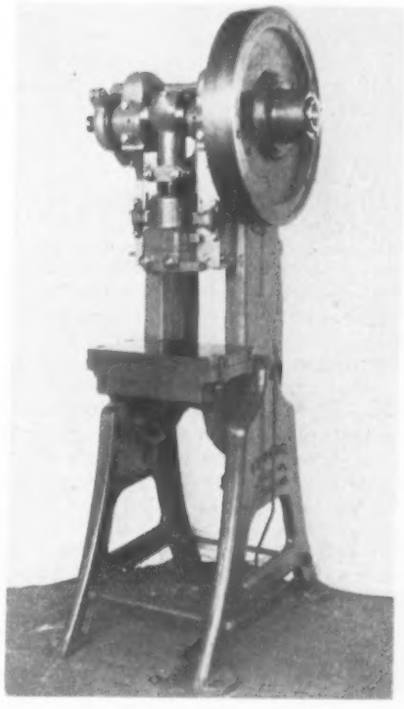
There are two separate electrical circuits easily adjustable and independent of each other. This means that it is possible with the timer to start in a "green" operator with the proper time interval to allow for shifting the work and as the operator becomes more proficient the "off-time" can be gradually shortened to compensate for the increasing efficiency of the operator.

The accompanying illustration shows the automatic repeat weld timer removed from its dust-tight cabinet. On the right side of the panel are the adjusting dials for the "off-time" and "welding-time." Below the upper dial which governs the "off-time" period, is a small double throw snap switch which permits the timer to be set for automatic repeat operation or to provide single shot operation for trial welds and similar temporary operation in which only one weld at a time is desired.

♦ ♦ ♦

Presses—Federal Press Co., Elkhart, Ind., has placed on the market an improved line of presses equipped standard with Timken roller bearings in the flywheel of all flywheel type units and roller bearings in the back shaft bearings of all back geared presses. The new type of flywheel does not cause the injury to the crankshaft ordinarily effected by the heavy wheel running on the top side of the crankshaft during the rest periods of the press, it is claimed. Because bearings will last practically the life of a press, much clutch trouble due to loose wobbly flywheel thus is eliminated. Turning down the crankshaft at the flywheel bearing also is eliminated. Therefore the new press, shown herewith, is of interest not only from the standpoint of service but also from the standpoint of safety as well, the company points out.

Other improvements include improved clamping device on the pitman for holding the adjustment of the ram adjusting screw; new style upper knockout brackets simplifying adjustment and also a new method of locking the ball cap in place. The unique means of locking the ball cap in place eliminates the possibility of throwing the cap off center. Nut or cap is threaded type that screws down on the ball end of the ram adjusting

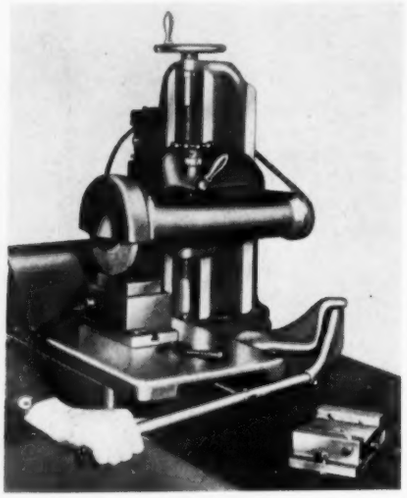


Federal press incorporates many improved design features

screw. The new locking device is so constructed as to keep the nut central so that when it becomes necessary to adjust the nut for wear the nut is not out of round.

♦ ♦ ♦

Small Surface Grinder—Diamond Machine Co., Providence, R. I., has developed a unit to meet the demand for a small surface grinding machine for tool, die and machinery makers for producing accurate plane surfaces on small parts. In this new machine, shown in the accompanying illustration, the cross feed is obtained without the usual intermediate table or the alternatively moving spindle housing. The table rests directly on a ground plane surface on the bed, and is guided longitudinally and laterally by a special knee-action control.



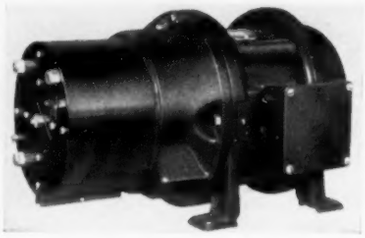
Small surface grinder designed recently by Diamond Machine Co.

It is claimed that unusual accuracy and finish is obtained as there is no play to affect the thickness of the work, and there is only one oil film subject to grinding pressure. The bed of the machine is of box construction, heavily ribbed to insure rigidity and to prevent distortion.

The saddle with its spindle housing is said to have adequate mass to absorb vibration, and has a new clamping feature. After coarse adjustment of the wheel to the work, the saddle is clamped rigidly to the upright. Micrometer graduated fine feed then is provided. The table has a platen with one t-slot for ⅜-inch bolts. It has longitudinal movement by a hand lever at the right of the machine, and a lateral movement by a handwheel at the left.

♦ ♦ ♦

Disk-Type Electric Brake — General Electric Co., Schenectady, N. Y., recently announced a compact, smooth-acting, disk-type electric brake designed for mounting directly on a number of types of G-E motors. The new brake, shown herewith, is intended especially for controlling small hoists, cranes, winches, and similar equipment. It is suitable for applications requiring no more than 50 pounds-feet braking torque on a continuous basis, or 75 pounds-feet on an intermittent basis.

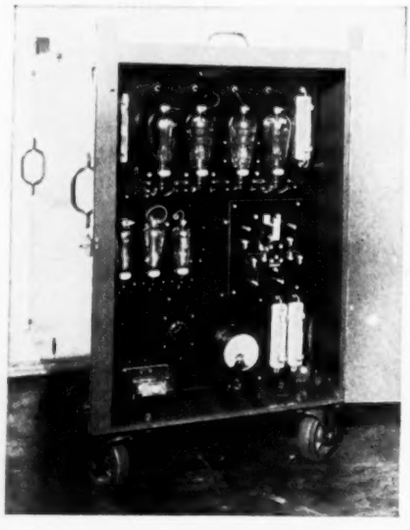


General Electric disk-type electric brake is compact

The brake is obtainable, completely mounted and wired, as a shipped-assembled unit on a ball-bearing squirrel-cage, wound-rotor, or single phase and direct-current motors in the NEMA frames. The motors may be open; splash-proof; totally enclosed, non-ventilated; or explosion-proof, non-ventilated — having electrical characteristics designated according to nine different types. The brake also is available separately and may be easily adapted to floor-mounting for use with other types of motors already in service. In construction, the new device is somewhat similar to an automobile clutch of the multiple-disk type.

♦ ♦ ♦

Ignition Welding Timer—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has brought out a portable ignition welding timer for accurate timing of all types of resistance welding machines. The unit, shown herewith, is so accurate in timing that it will pass electrical current for periods as short as one cycle (1/60 second) and is adjustable up to 30 cycles (½ second). Accurate timing has been found to be important in the fabrication of aluminum, aluminum alloys and high strength steels. In addition to its electrical advantages it is light in weight and small in dimensions so that it is extremely portable, being only 46 inches high, 42 inches long and 29 inches wide and weighing approximately 700 pounds. A unit of this size will carry electrical energy in magnitudes as high as 700 kilovolt-amperes, 440 volts single phase.



Ignition welding timer brought out by Westinghouse Electric & Mfg. Co.

Safety balancer introduced by Chicago Pneumatic Tool Co. developed for suspending and lifting portable tools

♦ ♦ ♦

Safety Balancer — Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, recently developed a sturdily built counterpoise for suspending, balancing and lifting portable tools or objects weighing up to 200 pounds. A combination of a tapered drum, single cable and a new method of applying spring force provides the balancer, shown above, with many outstanding advantages. The up and down stopping point is regulated by a mechanically operated geneva gear, independent of the cable. Both hooks furnished as standard equipment are of the closed throat or safety type.

In event of spring breakage a safety latch engages the teeth of the drum and prevents the load from dropping. The single cable construction allows for inspection and removal of the cable without disassembling or altering the spring adjustment. Springs can be adjusted for different loads by means of a hardened worm.

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Brazing with Silver Solders

(*Concluded from Page* 32)

precipitation is considered a time and temperature reaction it would seem as though the use of a silver solder with such a low flow point might overcome most of this difficulty if the heating is done quickly.

Frequent inquiry is made for a silver solder which will flow at temperatures below 1000 degrees Fahr. and produce strong joints. It is possible to alloy silver with different percentages of cadmium, zinc and tin and obtain alloys with thermal points ranging from the melting points of soft solders to those of standard silver solders. In many cases the resulting alloys are brittle and cannot be fabricated and when used in granular form give joints that are not satisfactory. Other combinations are malleable and have exceptionally long melting ranges with the solidus approaching the soft solder and, therefore, are of no particular commercial value. There has been, however, a limited use of compositions containing low percentages of silver in those places where a solder somewhat stronger than soft solders is satisfactory.

In summary, it may be stated that silver solders can be used on practically all ferrous and nonferrous metals and alloys having melting points above 1300 degrees Fahr. They can be obtained in granular or filed form, in sheets and strips from a few thousandths to any heavier gage that may be required and in wire in all diameters, thus making it possible to supply them in the form required for different sizes and types of joints.

Small Clearances in Joints

Their free-flowing properties and relatively low melting temperatures allow engineers to design joints with small clearances which will have great strength and ductility and will stand severe shocks and bending stresses.

A wide factor of safety is provided against damage to metals and alloys from overheating the parts to be joined because of the low temperatures required to flow silver solders. The time required to make the joint is correspondingly shorter and the labor cost is proportionately reduced.

Malleable butt and seam joints can be made which will stand severe cold work such as hammering, rolling, drawing and forming into different shapes. Scarf and lap joints on sheet metal and properly fitted pipe joints show high strength, often exceeding that of the metals themselves, and failure will take place outside the joint.

Corrosion resistance of silver solders is good and compares favorably with metals and alloys used particularly for their corrosion-resistant properties. Some compositions are more resistant than others to specific corrosive conditions and the galvanic attack which is affected by the metals joined necessitates careful tests in order to determine the most suitable solder.

Although the cost of silver solders per unit of weight is greater than that of base metal alloys this does not necessarily mean that the cost of making joints with silver solders is proportionately higher when all factors are taken into consideration. The strongest joints are obtained when a minimum amount of solder is used and by proper design of joint the actual weight of silver solder is so much less than that required for equivalent strength with base metal alloys that in some cases even the difference in first cost is negligible. In addition to this the lower temperature required, the saving in time and fewer rejections will, in many cases, offset the higher initial cost of the solder and show an actual economy over the use of base metal solders.

Heat Treating in Controlled Atmosphere Furnaces

(*Concluded from Page* 54)

gen and hydrogen) upon the wear of a hypoeuctectoid, a eutectoid, and a hypereutectoid carbon steel was studied. It was found that when these steels were hardened and subsequently tempered at low temperatures, the rates of wear were comparatively low; the wearing surfaces were smooth and were covered by a thin oxide film and the abraded particles consisted of Fe_2O_3 and Fe_3O_4. When these steels were tempered above certain temperatures, the rates of wear were extremely high; the worn surfaces were very rough and bright and the abraded particles were metallic iron.

Microscopic examinations were made of the structures below the wearing surfaces of the specimens after wear tests and the data obtained indicated:

1. The rates of wear of all steels when tested in air were low and the worn surfaces were smooth and covered with oxide films.

2. The rates of wear of the steels tempered at low temperatures and tested in an oxygen-free atmosphere were also low and the surfaces were smooth and filmed with oxides. These films, however, were lighter in color and apparently thinner than the films formed during tests in air.

3. The rates of wear of the steels tempered at higher temperatures and tested in an oxygen-free atmosphere were very high and the surfaces were very rough and free from film.

4. Microscopic examination of the specimens having smooth, filmed, worn surfaces showed that the structures adjacent to these surfaces were somewhat distorted and occasionally contained cracks approximately parallel to the wearing surface.

5. The microstructures adjacent to rough, film-free, worn surfaces were very severely distorted. Numerous cracks, frequently outlining lenticular areas of distorted metal, were characteristic of this type of wear.

6. The results of this study are contradictory to Fink's conclusion that no wear takes place between metallic surfaces if oxygen is absent from the surrounding atmosphere.

Died:

(*Concluded from Page* 22)

sociated with the Warner & Swasey Co., Cleveland, successively as draftsman, machine designer and mechanical engineer, at Cleveland Clinic hospital, Nov. 3, after a long illness. A native of Massachusetts, he was apprenticed to the machinist trade in 1880 at the Pratt & Whitney Co. in Hartford, Conn. He removed to Cleveland in 1888.

□ □ □

A. J. Kinnucan, formerly sales manager, Keystone Drawn Steel Co., Spring City, Pa., at his home in Wynnewood, Pa., Nov. 2.

□ □ □

W. E. Stephens, secretary and treasurer, Roberts & Mander Stove Co., Philadelphia, Nov. 1, as a result of an automobile accident.

□ □ □

S. J. Workman, superintendent, Agricola Pipe Foundry, Gadsden, Ala., in Birmingham, Ala., recently.

□ □ □

J. D. Hamrick, 49, auditor of Tennessee Coal, Iron & Railroad Co.'s coal mines in the Birmingham, Ala., district, in Birmingham recently. He had been with the company for 27 years.

□ □ □

W. L. Clements, 73, from 1898 to 1924 president of the Industrial Works, Bay City Mich., which was later absorbed by the Industrial Brownhoist Corp., at his home in Bay City, Nov. 6. He was a graduate of the University of Michigan, Ann Arbor, Mich., a former regent of that institution and a noted collector of early Americana. In 1923 he donated to the university a new library building and his own library which included many notable documents and volumes. He retired from business in 1924.

Raw Material and Finished Steel Demand Rising

Producers See Month Best Since First Quarter—Rate 27½ Per Cent—Prices Expected To Be Reaffirmed Nov. 20—Russia Buys 10,000 Tons of American Sheets

STRONGER demand for foundry coke and pig iron, increasing firmness in scrap, gradually mounting steel commitments from automobile manufacturers, and a spread in variety of orders from miscellaneous manufacturing consumers sustain iron and steel producers' confidence in business for the remainder of the quarter.

So far as current demand is concerned, the election results, which were generally anticipated, have had no effect. Specifications from consumers who are getting into seasonal production, and others with immediate requirements, have not been interrupted. Steelmakers, however, believe there may be some hesitancy in industrial expansion projects and equipment buying until after congress convenes. Much uncertainty has been dispelled by the more favorable attitude toward business adopted by the national administration.

Encouraged by bookings and inquiries, producers anticipate November will net the heaviest tonnage since the first quarter. Shipments are on the upgrade and material is going directly into consumption. Stocks are depleted, while users normally do not add to inventories at this time.

Automobile Companies Taking Pig Iron, Their Steel Releases Slow; Output Down

Nov. 20, being the date set for opening of books for first quarter, is expected to bring a decided impetus in new commitments. Until then all orders received must be shipped before the close of the year, a circumstance which has not been favorable to large-scale buying. Base prices on the majority of finished steel products, according to general opinion in the industry, will be reaffirmed. A reduction of $6 a ton on high-carbon spoke and high-carbon basic wire is now in effect, following a similar cut in high-carbon spring wire.

Leading automobile companies are taking more pig iron for castings for new models, and have placed contracts for a substantial portion of their first-half requirements with partsmakers. Releases on these orders, however, are slow in coming out; new assemblies may not start before December. Production last week tapered to 16,000 cars from 17,000 in the preceding week.

The Amtorg Trading Corp. has purchased 10,000 tons of sheets from American mills for immediate shipment to Russia for light automobiles.

More activity is apparent in the railroad market. The Pennsylvania is reported to have awarded a large fleet of electric locomotives for operation between New York and Washington. Twenty-one leading western systems have filed plans for air-conditioning equipment for 2500 cars. Illinois Central has awarded a five-car streamlined train and eight diesel switching locomotives. Norfolk & Western has distributed 3875 tons of tie plates, indicating early purchase of 10,000 tons of rails for which it recently inquired. Freight car awards in October numbering 75 brought the total for ten months to 23,465, compared with 1611 in the first ten last year.

5500 Tons of Shapes Awarded for Carnegie Mill; Eastern Forge Shops Busy

Topped by 5500 tons for the Carnegie Steel Co.'s strip mill building at MacDonald, O., structural shape awards last week rose to 14,118 tons from 7250 tons in the preceding week. San Francisco has placed 7469 tons of cast pipe.

Farm implement manufacturers continue to increase the size of their orders and are preparing for steady operations throughout the winter. Eastern forge shops are booked heavily on navy work.

Steelworks operations last week advanced ½-point to 27½ per cent. Cleveland was up 5 points to 43; Wheeling 8 to 39; New England 10 to 40; Pittsburgh 1 to 20; Chicago ½-point to 30½; Youngstown 1 to 31. Detroit was off 11 to 48; Buffalo unchanged at 26, Birmingham 25, and eastern Pennsylvania 20½.

Steel ingot production in October averaged 54,146 gross tons, up 8 per cent, while the total for the month, 1,461,932 tons was 16.8 per cent higher than in September. For ten months, output is 21,730,394 tons, 12.7 per cent more than in the period last year.

STEEL's price composites are unchanged, iron and steel $32.13; finished steel $54, and scrap $9.66.

COMPOSITE MARKET AVERAGES

	Nov. 10	Nov. 3	One Month Ago Oct., 1934	Three Months Ago Aug., 1934	One Year Ago Nov., 1933	Five Years Ago Nov., 1929
Iron and Steel Composite	$32.13	$32.13	$32.10	$32.24	$30.25	$35.60
Finished Steel Composite	54.00	54.00	54.00	54.00	49.20	56.48
Steelworks Scrap Composite	9.66	9.66	9.40	9.98	9.64	14.51

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Nov. 10, 1934	Oct. 1934	Aug. 1934	Nov. 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.80	1.75
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.65
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	28.00	28.00	26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00

	Nov. 10, 1934	Oct. 1934	Aug. 1934	Nov. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.76	19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	17.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	18.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.54
Gray forge, del. Pittsburgh	18.63	18.80	18.88	18.38
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	87.24
Scrap				
Heavy melting steel, Pittsburgh	$11.00	10.50	11.45	11.65
Heavy melt. steel, No. 2, east. Pa.	8.35	8.00	8.25	8.45
Heavy melting steel, Chicago	8.75	8.75	9.25	8.35
Rails for rolling, Chicago	10.25	9.90	10.50	10.25
Railroad steel specialties, Chicago	9.75	9.75	10.25	9.25
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	3.75
Connellsville, foundry, ovens	4.60	4.60	4.60	4.25
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.40c

Corrosion and Heat Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold strip	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05½c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75c-7.50c

REINFORCING

New billet, cut lengths, c. l.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis, on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve., 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot) □

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100 .15 to .25		Mo	0.50
4600 .20 to .30 Mo. 125-1.75 Ni.			1.05
5100 .80-1.10 Cr.			0.45
5100 Cr. spring			base
6100 bars			1.20
6100 spring			0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250....Carbon base plus extras			

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops □

Hot strip to 23⅞-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham, base	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c

Cooperage hoop,

Pittsburgh	1.95c
Chicago	2.05c

Cold-rolled strip,

Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pittsb., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thrd.	70-10-10-10 off
Rolled thread, ½ x 6 and smaller	70-10-10-10 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts	70-10-10-10 off
Tire bolts	60-10-10 off
Stove bolts, 75 off in pkgs.; 83 off in bulk, 15,000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller	70-10-10-10 off
Step bolts	70-10-10 off
Elevator bolts	70-10-10 off

NUTS

S.A.E. semifinished hex.; ½ to ⅞-inch.	70-10-10-10 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70-10 off

HEXAGON CAP SCREWS

Milled	85 off
Upset, 1-in., smaller	85-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., small	80 off
Headless set screws	75-10 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½, butt weld	57½
⅛-inch, but weld	50½
¼—⅜, buttweld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts., over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron; 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
3-in & over, east fdy	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B. Stnd. fitgs., Birm. base..$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur	$3.60- 3.85
Connellsville, fdry	4.60
Connell. prem. fdy.	5.10
New River fdry	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots	Spot
Pure benzol	19.00c
90 per cent benzol	19.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York

Phenol (200 lb drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

†Naphthalene flakes and balls, in bbl.	6.00c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25; 50-cent differentials apply to any grade below 1.75. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50

†Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00

Ohio

First quality	$40.00
Intermediary	36.00
Second quality	25.00
MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b Chewelah, Wash.	22.00
BASIC BRICK	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel, f.o.b. Ill., Key., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. fur. spot†	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper

Sheets	
Yellow brass (high)	14.50
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.50
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	17.00
Seamless copper	17.25
Rods	
High yellow brass	13.00
Copper, hot rolled	13.25
Anodes	
Copper untrimmed	13.75
Wire	
Yellow brass (high)	15.00

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.25- 4.50
Chicago	4.25- 4.50
Cleveland	4.75- 5.00
St. Louis	4.25- 4.50
Heavy Copper and Wire	
New York	5.50- 5.75
Chicago, No. 1	5.50- 5.75
Cleveland	5.25- 5.37½
St. Louis	5.00- 5.25
Composition Brass Borings	
New York	3.87½-4.12½
Light Copper	
New York	4.50- 4.75
Chicago	4.12½-4.37½
Cleveland	4.25- 4.75
St. Louis	4.25- 4.50
Light Brass	
Chicago	2.12½-2.37½
Cleveland	2.50- 2.75
Lead	
*New York	2.75- 2.87½
Cleveland	2.75- 2.90
Chicago	2.75- 3.00
St. Louis	2.75- 2.85
Zinc	
New York	1.75- 2.00
Cleveland	1.75- 1.85
St. Louis	2.50- 2.60
Aluminum	
Borings, Cleveland	6.00- 7.00
Mixed, cast, Cleve.	10.25-11.00
Mixed, cast, St. L.	10.50-11.00
Clips, soft, Cleve.	12.00-13.00

Secondary Metals

Brass ingot, 85-5-5-5	8.25
*Stand. No. 12 Alum.	15.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL	
Birmingham	8.00- 8.50
Boston, dealers	5.00- 5.25
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	8.50- 9.00
Chicago, No. 1	8.50- 9.00
Cleveland, No. 1	8.00- 8.50
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1	7.75- 8.25
Detroit, No. 2	6.75- 7.25
Eastern Pa.	9.75-10.00
Eastern Pa., No. 2	8.00- 8.75
Federal, Ill.	7.00- 7.50
Granite City, R. R.	6.50- 7.00
Granite City, No. 2	6.00- 6.50
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	6.50
Pittsburgh, No. 1	10.75-11.25
St. Louis	6.50- 7.00
Valleys, No. 1	10.50-11.00
COMPRESSED SHEETS	
Buffalo, dealers	8.50- 9.00
Chicago, factory	7.50- 8.00
Cleveland	7.00- 7.50
Detroit	7.75- 8.25
E. Pa., new mat.	9.50-10.00
Pittsburgh	10.75-11.25
St. Louis	5.00- 5.50
Valleys	10.00
BUNDLED SHEETS	
Buffalo	6.50- 7.00
Cincinnati, del.	6.00- 6.50
Cleveland	6.50- 7.00
Pittsburgh	9.00- 9.50
St. Louis	4.00- 4.25
SHEET CLIPPINGS, LOOSE	
Chicago	4.00- 4.50
Cincinnati	4.50- 5.00
Detroit	4.50- 5.00
St. Louis	3.50- 4.00
STEEL RAILS, SHORT	
Birmingham	10.00-10.50
Buffalo	11.50-12.00
Chicago (3 ft.)	10.50-11.00
Chicago (2 ft.)	11.50-12.00
Cincinnati, del.	9.75-10.25
Detroit	10.50-11.00
Pitts., open-hearth, 3 ft. and less	13.50-14.00
St. Louis, 2 ft. & less	10.00-10.50
STEEL RAILS, SCRAP	
Boston	5.00- 5.25
Chicago	8.50- 9.00
Pittsburgh	10.00-10.50
STOVE PLATE	
Birmingham	5.50- 6.00
Boston, dealers	3.25- 3.75
Buffalo	8.50- 9.00
Chicago, net	5.50- 6.00
Cincinnati, dealers	5.00- 5.50
Detroit, net	6.00- 6.50
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.00- 5.50
COUPLERS, SPRINGS	
Buffalo	12.00-12.50
Chicago, springs	9.50-10.00
Eastern Pa.	12.50-13.00
Pittsburgh	13.50-14.00
St. Louis	8.00- 8.50
ANGLE BARS—STEEL	
Chicago	9.00- 9.50
St. Louis	7.50- 8.00
RAILROAD SPECIALTIES	
Chicago	9.50-10.00
LOW PHOSPHORUS	
Buffalo, billets and bloom crops	11.50-12.00
Cleveland, billet, bloom crops	13.00-13.50
Eastern Pa., crops	13.50-14.00
Pittsburgh, billet, bloom crops	13.50-14.00
Pittsburgh, sheet bar crops	13.00-13.50
FROGS, SWITCHES	
Chicago	8.50- 9.00
St. Louis, cut	8.00- 8.50
SHOVELING STEEL	
Chicago	8.50- 9.00
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.00- 6.50
RAILROAD WROUGHT	
Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	7.00- 7.50
Chicago, No. 2	8.50- 9.00
Cincinnati, No. 2	7.00- 7.50
Eastern Pa.	10.50
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	5.75- 6.25
St. Louis, No. 2	6.75- 7.25
SPECIFICATION PIPE	
Boston	3.00- 3.25
Eastern Pa.	8.00
New York, dealers	3.50- 4.00
BUSHELING	
Buffalo, No. 1	8.50- 9.00
Chicago, No. 1	7.00- 7.50
Cinci., No. 1, deal.	5.50- 6.00
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	6.50- 7.00
Detroit, No. 1, new	6.75- 7.25
Valleys, new No. 1	9.75
MACHINE TURNINGS	
Birmingham	4.50- 5.00
Boston, dealers	1.25
Buffalo	4.75- 5.25
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.50- 5.00
Eastern Pa.	5.50
New York, dealers	1.75- 2.00
Pittsburgh	7.00- 7.50
St. Louis	3.00- 3.50
Valleys	8.00- 8.25
BORINGS AND TURNINGS	
For Blast Furnace Use	
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	5.75- 6.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
CAST IRON BORINGS	
Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.75- 7.25
Detroit	5.75- 6.25
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
St. Louis	3.00- 3.50
PIPE AND FLUES	
Cincinnati, dealers	4.00- 4.50
RAILROAD GRATE BARS	
Buffalo	6.50- 7.00
Chicago, net	5.00- 5.50
Cincinnati	4.00- 4.50
Eastern Pa.	8.00- 8.50
New York, dealers	4.00- 4.50
St. Louis	4.00- 4.50
FORGE FLASHINGS	
Boston, dealers	3.75- 4.00
Buffalo	8.50- 9.00
Cleveland	7.00- 7.50
Detroit	6.25- 6.75
FORGE SCRAP	
Boston, dealers	3.75
Chicago, heavy	9.50-10.00
Eastern Pa.	9.00
ARCH BARS, TRANSOMS	
St. Louis	10.00-10.50
AXLE TURNINGS	
Boston, dealers	3.00- 3.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	7.50- 8.00
Cleveland	6.00- 6.50
Eastern Pa.	9.00- 9.50
St. Louis	6.00- 6.25
STEEL CAR AXLES	
Birmingham	10.00-10.50
Boston, ship. point.	10.00-10.50
Buffalo	12.00-12.50
Chicago, net	10.00-10.50
Eastern Pa.	14.00-15.00
St. Louis	10.00-10.50
SHAFTING	
Boston, ship. point.	10.50-11.00
Eastern Pa.	16.00-16.50
New York, dealers	10.75-11.25
St. Louis	11.00-11.50
CAR WHEELS	
Birmingham, iron	9.00- 9.50
Boston, iron deal.	5.00- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	9.50-10.00
Chicago, rolled steel	9.50-10.00
Cincinnati, iron	7.50- 8.00
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	12.50-13.00
Pittsburgh, iron	10.00-10.50
Pittsburgh, steel	13.50-14.00
St. Louis, iron	7.25- 7.75
St. Louis, steel	8.75- 9.25
NO. 1 CAST SCRAP	
Birmingham	8.50- 9.00
Boston, No. 2	6.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	9.50-10.00
Buffalo, mach.	10.50-11.00
Chicago, agri. net	7.50- 8.00
Chicago, mach. net	8.50- 9.00
Chicago railroad net	8.00- 8.50
Cinci., mach. cup	8.50- 9.00
Cleveland, cupola	10.75-11.25
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.00
Pittsburgh, cupola	12.00-12.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	6.50- 7.00
St. L., No. 1 mach.	8.50- 9.00
HEAVY CAST	
Boston, del.	4.50- 4.75
Buffalo, break.	7.75- 8.25
Cleveland, break.	7.50- 8.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	10.00
N. Y., break. deal.	5.25- 5.75
Pittsburgh	10.00-10.50
MALLEABLE	
Boston, consum.	10.00-10.50
Buffalo	10.50-11.00
Chicago, R. R.	10.00-10.50
Cincinnati, agri. del.	7.50- 8.00
Cleveland, rail	10.75-11.25
Detroit, auto	8.75- 9.25
St. Louis, R. R.	7.00- 7.50
Eastern Pa., R. R.	10.50-11.00
RAILS FOR ROLLING	
5 feet and over	
Birmingham	9.50-10.00
Boston, dealers	8.00- 8.50
Buffalo	10.25-10.75
Chicago	10.00-10.50
Eastern Pa.	12.00-12.50
New York, dealer	7.50- 8.00
St. Louis	9.00- 9.50
LOCOMOTIVE TIRES	
Chicago (cut)	9.00- 9.50
St. Louis, No. 1	9.50-10.00
LOW PHOS. PUNCHINGS	
Buffalo	12.00-12.50
Chicago	11.00-11.50
Eastern Pa.	14.50-15.00
Pittsburgh	12.50-13.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper			Straits Tin		Lead	Lead	Zinc	Aluminum	Antimony	Nickel
	Electro., del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	New York Futures	N. Y.	East St. L.	St. L.	99%	Spot, N. Y.	Cathodes
Nov. 3	9.00	9.12½	7.37½	51.10	51.15	3.70	3.55	3.80	*19.00	10.12½	35.00
Nov. 5	9.00	9.12½	7.37½	51.12½	51.17	3.65	3.50	3.75	*19.00	10.50	35.00
Nov. 6—Holiday											
Nov. 7	9.00	9.12½	7.37½	51.25	51.32½	3.60	3.45	3.75	*19.00	11.50	35.00
Nov. 8	9.00	9.12½	7.37½	51.37½	51.45	3.60	3.45	3.75	*19.00	11.75	35.00
Nov. 9	9.00	9.12½	7.37½	51.20	51.27½	3.60	3.45	3.75	*19.00	11.50	35.00

*Nominal range 19.00c to 21.00c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES	
Baltimore*	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.45c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore *†.	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅛-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore(c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.00c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland(h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Nov. 8

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon.	$15.00 3 0 0	$13.21	1 13 0
Basic bessemer	13.50 2 14 0*	12.41	1 11 0
Hematite, Phos. .03-.05	15.13 3 0 6	.....	.....
SEMIFINISHED STEEL			
Billets	$27.50 5 10 0	$18.85	2 7 0
Wire rods, No. 5 gage	39.00 7 16 0	36.08	4 10 0
FINISHED STEEL			
Standard rails	$38.75 7 15 0	$44.10	5 10 0
Merchant bars	1.67c 7 10 0	1.15c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.65c 7 7 6	1.12c	3 1 6
Plates, †¼ in. or 5 mm	1.78c 8 0 0	1.50c	4 2 6
Sheets, black, 24 gage or 0.5 mm	2.06c 9 5 0	1.91c	5 5 0
Sheets, gal., 24 gage, corr.	2.51c 11 5 0	2.36c	6 10 0
Bands and strips	1.84c 8 5 0	1.45c	4 0 0
Plain wire, base	2.06c 9 5 0	1.94c	5 7 6
Galvanized wire, base	2.51c 11 5 0	2.27c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.68c 12 0 0	2.09c	5 15 0
Tin plate, box 108 lbs.	$ 4.50 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.87	3 7 6(a)	$13.84	210	$14.48	310	$25.35 63
Basic bessemer pig iron	16.87	3 7 6(a)*	12.19	185	13.31	285	27.97 (b) 69.50
Furnace coke	4.38	0 17 6	7.91	120	5.14	110	7.65 19
Billets	27.50	5 10 0	28.34	430	20.55	440	38.83 96.50
Standard rails	1.84c	8 5 0	2.10c	700	2.31c	1,100	2.40c 132
Merchant bars	1.92c	8 12 0	1.68c	560	1.16c	550	2.00c 110
Structural shapes	1.95c	8 15 0	1.65c	550	1.16c	550	1.96c 107.50
Plates, †¼-in. or 5 mm	1.88c	8 8 9	2.10c	700	1.47c	700	2.31c 127
Sheets, black	2.34c	10 10 0§	2.55c	850‡	1.63c	775‡	2.62c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.90c	13 0 0	4.50c	1,500	3.15c	1,500	6.73c 360
Plain wire	2.06c	9 5 0	3.39c	1,130	2.31c	1,100	3.15c 173
Bands and strips	2.12c	9 7 0	1.95c	650	1.47c	700	2.31c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

**Gold pound sterling carries a premium of 64.75 per cent over paper sterling.

(b) Plus straightening, cutting and quantoty differentials.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

(g) 50 bundles or over.

(h) Outside delivery, 10c less.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Bars

Bar Prices, Page 62

Pittsburgh—Bars for reinforcing purposes, cold drawing, and for some initial automotive assembly constitute the major tonnage in the present market. Merchant bars are far from active demand, but more important automotive specifications should be in the market later this month. The price of 1.80c, Pittsburgh, is firm.

Cleveland—November is showing a good gain in steel bar tonnage, compared with October, and sellers believe the month will be the best in bookings since second quarter. Consumers show more inclination to acquire stocks. Current prices generally are expected to be reaffirmed for first quarter when books are opened Dec. 1. In automobile business, both Chevrolet and Chrysler have released some tonnages for new models. Agricultural implement manufacturers are increasing purchases.

Chicago—Steel bar sales and specifications are gaining slowly, all consuming groups having participated in the betterment over recent weeks. Automotive business still consists principally of small lots. Most consumers have only small stocks and this factor is contributing to spot buying.

Boston—Commercial steel bars are slightly more active with a broader demand for small orders for quick delivery. There has been some gain in buying by bolt and nut makers in one or two instances.

Philadelphia—Orders for commercial steel bars are more numerous, although individual tonnages are so small that there is little increase in volume. Consumers' stocks generally are low, and with any improvement in general business bar specifications should increase appreciably.

Washington—Bids will be taken by the bureau of supplies and accounts, navy department, Nov. 13 for 142,510 pounds of medium grade M black hull steel plate.

Plates

Plate Prices, Page 62

Pittsburgh—Promising inquiry for plates continues from the river barge market and numerous inquiries are current which would be closed if terms of payment could be agreed upon. At least three inquiries, totaling around 40 barges, promise early purchase. The market holds at 1.80c, Pittsburgh.

Cleveland—More than 50 per cent of the inquiries for plates received by sellers in this district have clauses indicating they are for government-sponsored work, requiring affidavits that producers and suppliers are operating strictly according to codes. These are mainly from boilermakers in Ohio who are figuring on projects in other districts. Small tank fabricators are practically idle, while many Ohio municipalities have water tank projects awaiting federal aid. Railroad business is lacking. The Cleveland plate mills were down last week.

Chicago—Orders for fabricated plate work usually involve small lots. Recent railroad equipment orders take only small lots of plates and few freight car orders which would require larger tonnages are pending. Miscellaneous plate business is quiet and unchanged.

Boston—Lack of large tank work and slow operations by railroad repair and boiler shops confines plate

SAVE machine-hours in your fabricating operations by using steel more closely dimensioned for your purpose.

Many such opportunities for economy are found in B & L Extra Wide Flats. With these cold drawn sections, you can simplify the manufacture of machinery and equipment, requiring parts of unusual breadth, smoothness and accuracy.

They come in standard widths of 8", 10" and 12" in any thickness from ¼" to 2", cold sawed to length, not sheared. You will find them easy to work into stripper plates, bed plates, die backing plates and similar parts.

True in size and section, uniform in flatness and straightness, Extra Wide Flats give you the extra precision you need for quality production.

These handy sections may suggest savings in *your* plant—inquiries are invited.

- *Cold Drawn Bars and Shafting*
- *Free-Cutting Screw Stock*
- *Extra Wide Flats*
- *Special Sections*
- *Alloy Steels*

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* **BUFFALO, N.Y.**

orders largely to miscellaneous requirements. Bids close this week on approximately 1100 tons for the Portsmouth, N. H., navy yard.

Philadelphia—Plate production is being fairly sustained, but with orders small. The latest leading tank award in this district involves 200 tons for the Atlantic Refining Co., Philadelphia. Navy work is featured by the opening Nov. 16 on 4100 tons of plates, shapes and bars, principally plates. Lehigh Valley's 250 70-ton hopper cars, on which bids were opened Nov. 9, will provide some impetus in that direction; also, in a small measure, its program for the repair of 1100 box cars. Plates are 1.90c, Coatesville, or 1.98½c, Philadelphia.

New York—While a portion of the 4000 tons of tank work for oil companies, mentioned last week, has been placed, the major amount still is active.

About 750 tons will be required for an elevated water tank for Batavia, N. Y. Alexander Potter, 50 Church street, New York, is engineer.

San Francisco—Bids have been opened on the second unit of the Los Angeles aqueduct, calling for welded steel or reinforced concrete siphons. On the steel basis, involving 4100 tons, Western Pipe & Steel Co. was low. Several small pipe line projects are now pending, requiring 300 or 400 tons. New bids for 723 tons of sealing strips for the Fort Peck dam, Montana, will be opened Nov. 12.

Seattle—The largest plate tonnage in prospect is that for siphons on the Malheur river and at Dead Ox, parts of the Owyhee project in Oregon and Idaho. Bureau of reclamation will receive bids Nov. 26 at Ontario, Oreg., for 22,000 feet of 80-inch welded plate pipe at Malheur and 825 feet of 70-inch at Dead Ox, the lines to be supported on reinforced concrete piers. Alternate tenders for precast reinforced concrete pipe will be received. Bids have been opened at Boise, Idaho, for 800 feet of 18 to 30-inch steel pipe siphons.

Contracts Placed

280 tons, 11 tanks, Gulf Refining Co., Port Arthur, Tex., to Petroleum Iron Works Co., Houston, Tex.

235 tons, floor plates, highway bridges, Binghamton, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

200 tons, oil storage tank, Atlantic Refining Co., Point Breeze, Philadelphia, to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, two gas holders, Madison, Wis., sewage disposal plant, to Chicago Bridge & Iron Works, Chicago.

115 tons, three tanks, Independent Oil Co. of America, Kearney and Lyndhurst, N. J., to Chicago Bridge & Iron Works, Chicago.

100 tons, tanks for Swift & Co., Chicago, to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

5000 tons, Malheur river and Dead Ox siphons, Owyhee project, bureau of reclamation, Ontario, Oreg.; bids Nov. 26.

4100 tons, second unit Los Angeles aqueduct; Western Pipe & Steel Co., San Francisco, low on steel basis.

723 tons, sealing strips, Fort Peck dam, Montana; new bids Nov. 12.

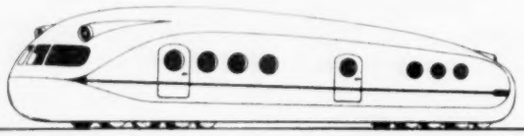
175 tons, 8 and 24-inch welded steel pipe, La Mesa, Spring Valley and Lemon Grove irrigation district, La Mesa, Calif; bids Nov. 17.

140 tons, storage tank, Vernon, Calif.; Pacific Coast Steel Corp., San Francisco, low.

Quicksilver

New York—Quicksilver prices are unchanged from last week despite signs of weakness a few days ago. Round lots are $73.50, a virgin flask of 76 pounds, and small lots $74.50.

HOISTS GO MODERN



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1/3 LIGHTER
100% SAFE

AL-LITE
Safety
HOIST
(of Alcoa Aluminum Alloy)

AL-LITE leads the way in today's swing to lighter, quicker, more logical hoists! It's the world's first and foremost MODERN Safety Hoist, built of certified Alcoa Aluminum Alloy and made 100% safe through a patented overload Governor that automatically indicates overload in excess of 50%.

Its simple, compact design and strong aluminum construction make it ⅓ lighter and a real *one-man* hoist. Yet, in spite of lightness, AL-LITE is outstandingly strong, with a 5 to 1 safety factor.

Get "streamlined action" into *your* hoisting operation with an AL-LITE—the only hoist that is *completely* modern in design and efficiency. Ask your distributor, or write Chisholm-Moore Hoist Corp., Tonawanda, N. Y. (Division Columbus-McKinnon Chain Corporation.

CHISHOLM-MOORE
CHAIN HOISTS TROLLEYS — CM — ELECTRIC HOISTS CRANES

AL-LITE

Sheets

Sheet Prices, Page 62

Pittsburgh—An improved volume of buying for steel drums, requiring black sheets, has been a sustaining factor to mill operations which are now up to 30 per cent. In addition, automobile interests have ordered some round tonnages of full-finished sheets, but these have been widely spread over a number of sources of supply. The market has an improved tone. Prices are steady.

Cleveland—Automobile manufacturers are beginning to place contracts for parts that will be required in the first half of 1935, and while orders for sheets are more numerous tonnages still are relatively light. Substantial buying is expected within a week or ten days. The steel code requires that all material booked this month be shipped before the end of the quarter. Books for the first quarter will be opened Nov. 20. Consumers generally are asking for immediate delivery, due to low level of stocks. Demand from manufacturers of household equipment is fairly steady.

Chicago — Sheet business lacks improvement principally because of delays in automotive orders and releases. This demand is expected to improve within the next several weeks and substantial tonnages are looked for in December. Activities of farm implement manufacturers account for larger sheet orders, consumption by this industry being ahead of the rate a month ago. Purchases by miscellaneous sheet users generally are for small lots for prompt needs with the total volume well maintained.

Boston—Sheet buying is sluggish, galvanized showing slight improvement. Outside repair work has been more active. Carlot orders are few, however, most orders being for light tonnages.

New York—Amtorg Trading Corp., has placed about 10,000 tons of cold and hot-rolled sheets with American producers, for prompt shipment to Russia for production of light automobiles.

Two large building projects here will take several hundred tons in the aggregate, one being the federal post-office on which bids were opened Nov. 9, and the other municipal pier 45, North river, on which specifications will be issued shortly. Prices are expected to be reaffirmed for first quarter, with filing of quotations scheduled to begin Nov. 20.

Philadelphia—Some fair-size auto-body tonnage should come out here within the next fortnight, sheet sellers declare. Little else outstanding is in prospect, apart from navy work. Meanwhile, demand from stovemakers is tapering, seasonably. While no change in prices is being discussed, the trade awaits with interest filing of prices for first quarter, beginning probably around Nov. 20.

Buffalo—Production in district sheet mills continues at 15 to 20 per cent. There is a possibility of increased output toward the end of the year.

Cincinnati—Sheet buying, still restricted to early needs, is holding at the improved level attained late in October. Automotive orders are improved, with expectation of heavier specifications later this month. Shipments to electrical refrigerator manufacturers show gains. Mill schedules are above 30 per cent.

Birmingham, Ala.—Sheet mill operations are steady. Some business

Liquitol

Reduces INGOT COSTS

***What is* LIQUITOL?**

A scientifically prepared fine dry powder which insures sound iron castings, sound steel castings and sound steel ingots.

LIQUITOL retards Cooling of hot-top metal. Working on the theory that secondary piping is caused by occluded gases, it follows that if the hot-top is kept open longer gases have a better chance to escape.

Why is* LIQUITOL *used?

Eliminates piping in castings and ingots.

Heads reduced 40%.

Castings are structurally more perfect.

Cavities and porosities practically eliminated. Scrap heads and runners are greatly reduced. Better fluidity of molten metal during cooling. Additional feeding of heads reduced, thus prevents waste.

Does not injure or affect physical or analytical properties of steel or cast iron in any way.

Where intermittent feeding is practiced there is absolutely no possibility of LIQUITOL being carried into ingot or casting.

Does not solidify but forms a fusible coating which can be disturbed for observation. Additional metal can be poured through LIQUITOL without danger of LIQUITOL entering body of ingot or casting.

LIQUITOL saves its cost many times, due to sounder ingots and castings you secure through its use.

Ask for Bulletin AL 16A

THE ALPHA-LUX COMPANY, INC.

192 Front St.

NEW YORK CITY

Branches: Philadelphia - Chicago

is expected shortly from agricultural sections.

St. Louis—Sheet business is quiet in this district. Demand for galvanized is disappointing, seasonal requirements for ruural improvements having failed to appear. Manufacturers of miscellaneous products continue to account for liberal tonnages.

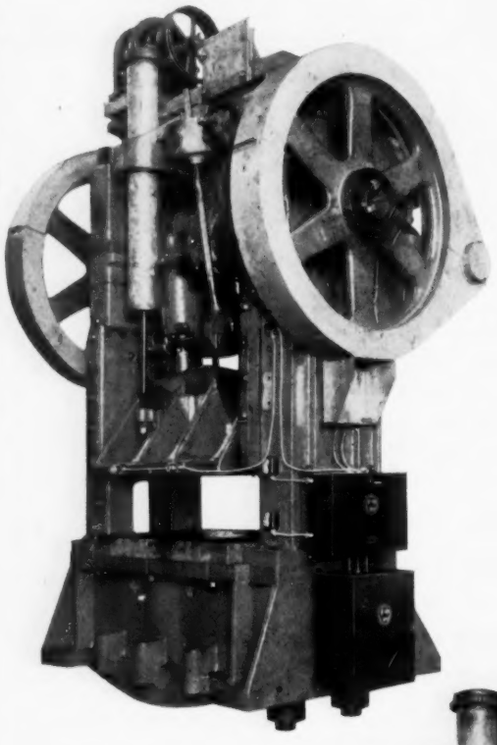
B. W. Vinson Co. Inc., Hunt building, Tulsa, Okla., has been appointed sales representative in the Tulsa district for the Edward Valve & Mfg. Co., East Chicago, Ind.

Tin Plate

Tin Plate Prices, Page 62

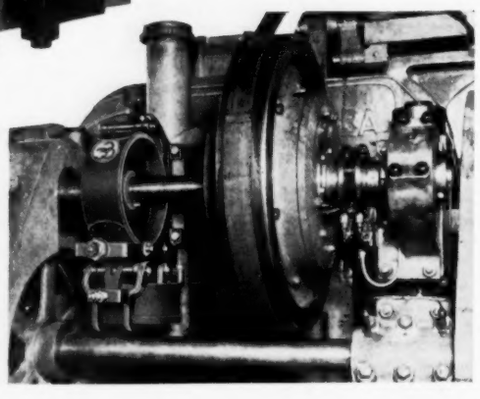
Pittsburgh—With canmakers to work down tin plate inventories, the average of operations in the tin plate producing industry is expected to decline from the present 35 per cent rate. A considerable volume is continuing to move for export. It is generally believed that no change will be made for next year's tin plate contracts from the present $5.25, Pittsburgh market.

New Power Press Control Insures Safety



Safety to the operator is one of the main features of the automatic electric control operation of power presses developed by Clark Controller through the use of automatic control panel and electric brake. The power unit actually running the press has no connection with this control unit.

The safety feature is the non-repeat control system of operating the press. The installation illustrated is on a Niagara press although the same unit could be applied to any similar press. Patent pending.



Above illustration is complete view of press showing the automatic control panel while view at the right shows the electric brake unit.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
Cleveland, Ohio

Transportation

Track Material Prices, Page 63

Award of a large fleet of electric locomotives by the Pennsylvania for operation between New York and Washington is reliably reported.

Western railroads have an extensive program for air conditioning passenger cars. Twenty-one of the larger systems have filed plans with the Western Association of Railway Executives, which may involve as many as 2500 cars.

Other activity in railroad markets also has centered on equipment, with the Illinois Central closing on a streamlined passenger train and on 11 diesel electric locomotives for switching and transfer service. The streamline train is to be used between Chicago and St. Louis and will be built by the Pullman Car & Mfg. Corp., Chicago, to a large extent of Cor-Ten steel. It will consist of five cars.

Domestic freight car buying in October consisted of 75 cars, all placed in one order. Comparisons with previous months follow:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	19,725	0	35	50
March	30	5	105	2,166
April	800	50	0	2,798
May	717	8	60	20
June	1,835	500	0	1,910
July	19	306	25	617
Aug.	105	202	5	1,304
Sept.	7	23	1,298	703
Oct.	75	514	0	980
10 mo	23,465	1,611	1,687	10,649
Nov.	.....	533	2	35
Dec.	.....	316	50	11
Total	.....	2,460	1,739	10,694

Norfolk & Western has distributed 3875 tons of tie plates between Wheeling Steel Corp., Wheeling, W. Va., Republic Steel Corp., Youngstown, O., and others. Allotment of rails and spikes is expected to be announced shortly.

Featuring car demand is the opening of bids last week by the Lehigh Valley on 257 70-ton hopper cars.

Port commission of Stockton, Calif., has bought 100 tons of 90-pound relaying rails and the city of Los Angeles is inquiring for 690 tons of 40-pound rail.

Car Orders Placed

Illinois Central, five-car streamline pas-

senger train to Pullman Car & Mfg. Corp., Chicago.

Mesta Machine Co., Pittsburgh, two flat cars and two gondolas, all of 100 tons capacity, to Standard Steel Car Corp., New York.

Locomotives Placed

Atchison, Topeka & Santa Fe, 3600-horsepower diesel passenger locomotive, to Winton Engine Corp., Cleveland.

Illinois Central, eight 600-horsepower diesel electric switching engines to American Locomotive Co., New York; one 2000-horsepower transfer engine to Busch-Sulzer Bros. Diesel Electric Engine Co., St. Louis; one 1800-horsepower engine each to Winton Engine Co., Cleveland, and Ingersoll-Rand Inc., New York.

Car Orders Pending

Minnesota Mining & Mfg. Co., St. Paul, 25 to 100 70-ton hopper cars; bids asked.

Pipe

Pipe Prices, Page 63

Pittsburgh—An increasing amount of standard pipe has been requisitioned recently by a number of jobbers, apparently finding improved business through building rehabilitation, both residential and industrial. The 100-mile pipe line in New Jersey for the Sun Oil Co. continues to be promising for an award next spring. With the filing on or about Nov. 20 of discounts on tubular products, to be in effect for the first quarter of next year, it is generally anticipated that no change will be made from existing schedules. The recently announced base price of 8.75c on cold-drawn chrome-molybdenum front axle tubing in 0.146-inch or less wall thickness, ½ to 3-inch o.d., applies to all basing points including Shelby, O., as well as Pittburgh, Milwaukee and Canton, O.

Chicago—The city is inquiring for 203 tons of special fittings but has yet to close on 328 tons of 36-inch pipe on which bids were taken a month ago. Bids close Dec. 3 on several hundred tons for the Hammond, Ind., filtration plant. Awards are light and few large tonnages are being placed.

Boston—Cast pipe buying has slumped, with less inquiry. A fair small-lot volume is being purchased for relief work projects.

New York—Cast pipe activity has declined, bulk of buying being confined to small fill-in lots with inquiry light. A small tonnage is up for a sewer at Ardsley, N. Y. Utilities are not buying to any extent.

Department of water supply here closes Nov. 19 on a large tonnage of 72-inch steel watermain for installation in Central park.

Birmingham, Ala. — Disappointment is caused by slowness of development of projects requiring considerable tonnage of pipe.

San Francisco—This city has placed the second largest contract of the year—7469 tons of high-pressure cast pipe, with an eastern pipe shop.

Although bookings so far this year are well below the aggregate for the same period last year, a number of municipalities are expected to come into the market for sizable tonnages in the next two months. Enterprise Foundry Co. here was awarded 194 tons of cast steel fittings for San Francisco.

Seattle—Business in pipe is at a standstill, with no specifications up for figures and practically no turnover out of stock. Centralia, Wash., will hold a special election Nov. 28 to approve a bond issue of $46,000 for replacing 14,000 feet of gravity pipe.

The NEWPORT ROLLING MILL CO.
Since 1891 producers of HIGH GRADE IRON and STEEL SHEETS FOR EVERY PURPOSE
The outstanding base metal for the finest porcelain enameling. Metallurgically pure, free from grease or pickle marks, the smooth, satiny surface of GOHI Enameling Iron holds the enamel tightly, and elinimates the usual enameling troubles. Use GOHI Enameling Iron—the choice of leading enamelers.
Produced exclusively by The Newport Rolling Mill Co., Newport, Kentucky
ENAMELING GOHI IRON SHEETS
Hot and Cold Rolled Sheets ● Newport Electrical Sheets ● GOHI Pure Iron-Copper Alloy ● Globe Brand Galvanized Sheets ● GOHI Enameling Sheets ● Kentucky Copper Bearing Steel ● Newport Long Terne Sheets.
ENAMELING IRON
THE NEWPORT ROLLING MILL CO., NEWPORT, KY.

total cost to be $80,000, balance to be furnished by state and federal funds.

Cast Pipe Pending

1000 tons, White Plains, N. Y.; bids Nov. 14.

231 tons, 3 to 6-inch, also fittings, gates, conduit lining and penstock, as well as 12,685 feet of 8 to 38-inch, Ogden city water supply at Pine View dam, Ogden river project, Utah; bids Nov. 22 at Denver office of bureau of reclamation.

203 tons, fittings for 3 to 24-inch pipe, Chicago; bids Nov. 16 to commissioner of public works.

119 tons, 4 to 12-inch, class 150, Modesto, Calif.; bids Nov. 14.

110 tons, 8 and 12-inch, class 150, Huntington Park, Calif.; bids in.

Cast Pipe Placed

7469 tons, high-pressure pipe, San Francisco, to United States Pipe & Foundry Co., Burlington, N. J.

275 tons, 10 and 12-inch, water project, Beverly-Salem, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

BUILT BY MORGAN *Engineering* » »

TWO Morgan 7½-ton, 6-motor, 63′ 6″ span four-girder Low Type Soaking Pit cranes, with worm operated trolleys, are shown here. They were installed to replace two Morgan Tower Type Pit cranes which had been in service for 30 years—a conspicuous, but not unusual record of Morgan engineering integrity. For charging ingots into soaking pits and withdrawing them, this type of crane performs the work with the minimum of expense and labor. Morgan engineers developed the one-piece box section cast steel trolley frame that severe service cannot distort. We have built a large number of Soaking Pit Cranes equipped with roller bearings and worm reduction units; the names of their users—the names of the leaders in the steel industry.

Morgan Products Include

BLOOMING MILLS
PLATE MILLS
CONTINUOUS MILLS
STRUCTURAL MILLS
ELECTRIC TRAVELING CRANES
CHARGING MACHINES
INGOT STRIPPING MACHINES
LADLE CRANES
SOAKING PIT CRANES
STEAM HAMMERS
STEAM HYDRAULIC FORGING PRESSES
SPECIAL MACHINERY FOR STEEL MILLS

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DESIGNERS
MANUFACTURERS
CONTRACTORS

THE MORGAN ENGINEERING COMPANY

New York, 11 W. 42d St. ALLIANCE, OHIO *Pittsburgh, 1420 Oliver Bldg.*

Shapes

Structural Shape Prices, Page 62

Pittsburgh — Carnegie Steel Co., Pittsburgh, has awarded 5500 tons of structural shapes to American Bridge Co., Pittsburgh, for its new 42-inch, 4-high continuous strip mill at Youngstown, O. Structural shape contracts and inquiries are less numerous, and scattered state highway work makes up most of the pending tonnage. Plain structural steel continues 1.80c, Pittsburgh, but judging from a recent letting in this district, fabricated and erected prices are irregular. On this job, fabricated and erected prices ranged from around 4 cents to 5¼ cents per pound.

Cleveland—Early award of 3060 tons of structural shapes for the Lorain avenue bridge over Rocky river, Cuyahoga county (Cleveland) is expected, general contract bids going in this week. Small jobs up for figures are fairly plentiful, and bookings of plain material increased moderately during the week.

Chicago — Structural orders and inquiries in most instances involve individual lots of less than 500 tons. Except for Mississippi river dams no large projects are scheduled for early bids and fabricators are depending principally on bridges and miscellaneous forms of public construction for new inquiries. Delays still are encountered in effecting financing for the completion of the Chicago outer drive bridge.

Boston—Except for 8500 tons required for the parcel post building, Boston, provisionally awarded, but still pending, structural steel volume is lighter. Small bridges and an increasing number of school buildings taking from 200 to 350 tons each predominate.

New York — Structural steel awards are slightly heavier, including 740 tons for an apartment and several smaller awards. Bids are

Shape Awards Compared

	Tons
Week ended Nov. 10	14,118
Week ended Nov. 3	7,250
Week ended Oct. 27	14,183
This week in 1933	7,055
Weekly average, 1933	9,296
Weekly average, 1934	16,702
Weekly average, October	15,673
Total to date, 1933	648,034
Total to date, 1934	751,630

due to be closed this week on the downtown New York federal building, taking close to 20,000 tons of steel. Piers active or about to come out for bids account for 3900 tons.

A revival is noted in small apartment construction, but except for columns much of the material purchased is used steel. The New York city approach to the midtown tunnel will require approximately 2500 tons of shapes, 1400 tons of bars and a substantial tonnage of cast iron or steel lining. Bids may not be asked until January. Considerable piling may be needed for a mile of bulkhead contemplated for Coney island.

Philadelphia—No structural award of size has been reported since the placing of work for the high-speed line bridge here. Apart from the federal aircraft factory building here, and a station for the high-speed line in Camden, N. J., the latter requiring 200 tons, little is in sight. Shape makers are expected to reaffirm present prices for next quarter.

Washington—The bureau of supplies and accounts, navy department, will take bids Nov. 16 on the following structural material for various navy yards, this being material for warships under the new naval expansion program: 500 tons of angles, 220 tons of channels, 956 tons of beams, and 16 tons of tees.

Birmingham, Ala. — Fabricating shops report business lagging. Backlogs are being worked down steadily and not much is expected during the remainder of the year.

San Francisco—Bookings of structural shapes last week were the largest in over nine weeks, totaling 2689 tons and bringing the aggregate for the year to 109,914 tons. The outstanding award was 825 tons for the psychopathic ward, San Francisco hospital, to Judson-Pacific Co., San Francisco.

Seattle—The week's only structural shape award, 300 tons for Seattle's Diablo dam powerhouse, went to Wallace Bridge & Structural Steel Co., Seattle. For the same project A. M. Castle & Co. was awarded 100 tons of steel sheet piling. Martin Sundrelich, Jefferson City, Mo., has a war department contract for the Fort Peck, Mont., spillway, at $1,168,120, involving unstated tonnages.

Shape Contracts Placed

5500 tons, mill building, Youngstown, O., to house new 42-inch, 4-high continuous hot strip rolling mill at MacDonald works of Carnegie Steel Co., to American Bridge Co., Pittsburgh.

825 tons, psychopathic ward, General hospital, San Francisco, to Judson-Pacific Co., San Francisco.

800 tons, state bridge, Covington, Ky., to R. C. Mahon Co., Detroit.

750 tons, bridge, Cumberland river, Carthage, Tenn., to Vincennes Bridge Co., Vincennes, Ind.

740 tons, apartment, 231 East Seventy-third street, New York, to Harris Structural Steel Co., New York.

650 tons, jail buildings, Bordentown, N. J., to Newton A. K. Bugbee, Trenton, N. J.

450 tons, bus terminal, Capital Transit Co., Washington, to Lehigh Structural Steel Co., Allentown, Pa.

410 tons, bridge, NRH 284-F, Clay county, Kansas, to St. Joseph Structural Steel Co., St. Joseph, Mo.

395 tons, destructor plants, Bergen Landing, Queens, N. Y., and Betts avenue, Maspeth, N. Y., to American Bridge Co., Pittsburgh.

330 tons, powerhouse, state reformatory, Elmira, N. Y., to American Bridge Co., Pittsburgh; W. E. Wark Co., Philadelphia, general contractor.

310 tons, two bridges, Handley and Marmet, W. Va., for New Kanawha Power Co., to Virginia Bridge & Iron Co., Roanoke, Va.

310 tons, state highway bridge, Augusta, Wis., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, bridge, St. Louis, to Mississippi

Valley Structural Steel Co., Decatur, Ill.

260 tons, highway bridge repairs, Binghamton, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

250 tons, alterations, high school, Bell, Calif., to Pacific Coast Steel Corp., San Francisco.

240 tons, state highway bridge, Plymouth, N. H., to Lackawanna Steel Construction Corp., Buffalo.

200 tons, bridge, Franklin county, Arkansas, to St. Louis Structural Steel Co., St. Louis.

185 tons, addition, Cascade Laundry Co., Brooklyn, N. Y., to Reiche & Penner, Brooklyn.

180 tons, three state highway bridges at Forbes, Angora and Cooke, Minn., to American Bridge Co., Pittsburgh.

160 tons, buildings, United States Immigration station, Ellis Island, New York, to Lehigh Structural Steel Co., Allentown, Pa.; George F. Driscoll Co., Brooklyn, general contractor.

155 tons, state highway bridge, Cherokee county, Canton, Ga., to American Bridge Co., Pittsburgh.

150 tons, bridge, Poplar Bluffs, Mo., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, building, Anheuser-Busch Co., New York, to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, state highway bridge, Lynxville, Wis., to Fort Pitt Bridge Works, Pittsburgh.

150 tons, highway bridge, Pike county, Ohio, to Burger Iron Works, Akron, O.

135 tons, Big Four bridge, International Harvester Co., Springfield, O., to Mt. Vernon Bridge Co., Mount Vernon, O.

133 tons, Milk river bridge, Valley county, Montana, to unnamed interest.

130 tons, state highway bridge, RC-3584, Allegany county, New York, to Lackawanna Steel Construction Corp., Buffalo; H. E. Bunce, Hornell, N. Y., general contractor.

120 tons, alterations, gymnasium, Union high school, Whittier, Calif., to Pacific Coast Steel Corp., San Francisco.

100 tons, crane rails, specification 629-D, Boulder dam, Boulder City, Nev., to unnamed interest.

Shape Contracts Pending

20,000 tons, downtown federal building, New York; James M. Stewart Co., low on one alternate; George F. Driscoll Co., low on second alternate.

3700 tons, hospital, Jersey City, N. J.; Lehigh Structural Steel Co., Allentown, Pa., low.

3000 tons, pier 45, department of docks, New York; specifiations in about two weeks.

1692 tons, including 500 tons of angles, 220 tons channels, 956 tons beams and 16 tons tees; bids Nov. 16 to bureau of supplies and accounts, navy department, Washington, delivery to various navy yards.

1400 tons, sheet steel piling, retaining walls for Rivo Alto, Naples and Colannade canals, Long Beach, Calif., Los Angeles county has appropriated funds.

1060 to 1600 tons, tunnel ribs, metropolitan water district, Los Angeles; bids Nov. 9.

1000 tons, school, Long Beach, Calif.; bids soon.

900 tons, pier, New York Dock Co., Brooklyn, N. Y.

800 tons, dam, Sheffield, Ala.

650 tons, postoffice, Des Moines, Iowa.

500 tons, scattered state highway bridges, Nebraska.

500 tons, postoffice, San Pedro, Calif.; bids soon.

475 tons, 12 state bridges, Nebraska.

300 tons, building in Baltimore, for Crown Cork & Seal Co., Baltimore.

300 tons, high school, Ogden, Utah.

200 tons, station, high speed line over Delaware river bridge, Camden, N. J.; bids to be taken shortly.

150 tons, state viaduct, Dorchester, Nebr.

135 tons, state bridge, Unadilla, N. Y.

Reinforcing

Reinforcing Bar Prices, Page 63

Pittsburgh—Reinforcing steel bars are active and among inquiries are several hundred tons for two Ohio river earth dams which the Zanesville, O., army engineers will take bids on Nov. 13 and 15. Reinforcing steel bar requirements will be purchased direct through the latter office. Regular Friday awards continue in the state of Pennsylvania, the Nov. 23 list including work in five counties. New billet bars are 2.05c, Pittsburgh, for cut lengths.

Cleveland—Demand is restricted to public works projects taking small lots. In the state highway department's proposals for bids Nov. 16 and 17 are a dozen jobs, collectively requiring 270 tons, including 228 tons for the Rocky river, Cuyahoga county (Cleveland) bridge. A Cuyahoga county culvert, on which bids are to be taken Nov. 15, requires 232 tons. Including two bridges in Ashtabula county, Ohio, previously listed, about 1000 tons of reinforcing bars are pending in this district.

Chicago—Reinforcing bar orders for both public and private projects are lighter with few large tonnages pending except for several federal dams. A fair number of orders involving 50 tons or less are being received but bookings are lighter

Concrete Awards Compared

	Tons
Week ended Nov. 10	1,988
Week ended Nov. 3	1,851
Week ended Oct. 27	2,235
This week in 1933	2,100
Weekly average for 1933	3,232
Weekly average, 1934	4,489
Weekly average, October	3,229
Total to date, 1933	162,277
Total to date, 1934	202,027

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than was true a month ago. Additional orders for road work are expected to be placed within the next several weeks.

Boston—Reinforcing bar buying is less active, although small orders are holding well. Bids are in on 100 tons for a highway in Connecticut.

New York—Highway mesh continues to lead reinforcing steel activity, although awards have dropped to several hundred tons with several contracts requiring about 450 tons of mesh in the next New York state openings, Nov. 13 and 20. Federal building here, bids in, and piers about to come out in New York lead pending requirements.

Philadelphia—The aircraft factory here, requiring approximately 500 tons of bars, as well as 800 tons of shapes, and a state bridge at Georgetown, Del., requiring 100 tons of bars are among the principal projects pending. Billet steel bars, cut lengths, are 2.05c, Pittsburgh, or 2.34c, Philadelphia.

San Francisco—Awards of reinforcing bars during the week were the largest of any week in more than two months, aggregating over 1300 tons and bringing the total for the year to 94,615 tons. Contract for 45,000 tons for the Los Angeles aqueduct still is pending.

Seattle—No specifications of importance are up for figures and new tonnages are small. There is no announcement when the government will ask bids for the 12,500 tons required for Coulle, Wash., dam. A proposed $200,000 railroad subway at Boise, Idaho may require an unstated tonnage of concrete bars.

Reinforcing Steel Awards

519 tons, state highway bridge, Covington, Ky., to Truscon Steel Co., Youngstown, O.

200 tons, Chesapeake & Ohio coal handling dock, Toledo, O., through the Empire Construction Co., Baltimore, general contractor, to American Steel Engineering Co., Philadelphia.

184 tons, psychopathic ward, General hospital, San Francisco, to Gunn, Carle & Co., San Francisco.

170 tons, water project, Beverly-Salem, Mass., to Northern Steel Co., Boston.

155 tons, highway bridges, Connecticut, largest at Greenwich, to Truscon Steel Co., Youngstown, O.; Peter Mitchell Inc., general contractor for Greenwich bridge.

150 tons, mesh, Hudson-Hollowville highway 650, Columbia county, New York, to American Steel & Wire Co., New York; A. Colarusso & Son Inc., Hudson, N. Y., general contractor.

107 tons, bridge in Mora county, New Mexico, to unnamed interest.

103 tons, Weiser river bridge, Washington county, Idaho, to unnamed interest.

100 tons, alterations, school at Seventy-ninth and McKinley station, Los Angeles, to unnamed interest.

Reinforcing Steel Pending

10,500 tons, second unit, Los Angeles, aqueduct; bids opened.

450 tons, mesh, highways, New York state; bids Nov. 13 and 20.

232 tons, Nine-mile creek culvert, Cleveland-East Cleveland, O.; bids to commissioners of Cuyahoga county, Cleveland, Nov. 15.

175 tons, state bridges, Nebraska.

161 tons, Leechburg, Pa., state bridge; Freeland, McHale & Patten, Pittsburgh, low on general contract.

100 tons, state bridge, Georgetown, Del.; bids, Nov. 18; approximately 50 tons of shapes also required.

100 tons, alterations, Polytechnic high school, Long Beach, Calif.; general contract to Person & Theil, Long Beach, Calif.

Cold Finished

Cold Finished Prices, Page 63

Pittsburgh—No change from the existing market of 2.10c, Pittsburgh,

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on cold-drawn carbon bars or 2.95c on cold-drawn alloy bars is expected to be taken for the first quarter of next year, according to general trade opinion. Meanwhile, specifications show considerable promise for the appearance of automotive buying. Miscellaneous manufacturers, some jobbers and agricultural implement makers have been active enough in cold-drawn bar buying to sustain the market fairly well.

Strip Steel

Strip Prices, Page 63

Pittsburgh — More orders for hot-rolled strip, both in carload and less-carload quantities have appeared, and last week specifications included several 50 and 100-ton lots from automotive hardware makers, and from a well diversified list of miscellaneous manufacturers. Although changes are being considered in certain hot-rolled and cold-rolled strip steel extras, the present base price of 1.85c on hot strip and 2.60c on cold strip is firm.

Cleveland—Although some fairly good orders for hot rolled strip have been booked from automobile manufacturers, producers are awaiting specifications which are expected this month. Mill operations have improved slightly.

Chicago — More substantial improvement in strip demand awaits release of heavier orders from the automotive industry. Some betterment is noted in specifications from miscellaneous users.

Boston—Total volume of incoming cold strip orders is heavier, but buying is still spotty. Rolling operations are up slightly. Demand is broadened, but small orders predominate and are more numerous.

Philadelphia — Little change is noted in strip, with buying spotty and prices steady at 1.85c, Pittsburgh, or 2.14c, Philadelphia, for hot strip and 2.60c, Pittsburgh, or 2.89c, Philadelphia, for cold strip.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 63

Carriage and machine bolts hold at 70-10-10-10 off list with some shading in a mid-western market where one maker is soliciting business at an additional five points off list. Large rivets are 2.90c, Pittsburgh or Cleveland and 3.00c, Chicago, and small rivets at 70-5 off. Restricted buying characterized commitments from jobbers, railroads and agricultural implement trades.

Wire

Wire Prices, Page 63

Pittsburgh — Both high-carbon spoke wire and high-carbon basic wire have been reduced $6 a ton, effective with Nov. 11, these reductions closely following upon a similar cut in high-carbon spring wire, in effect since Nov. 5. The new market on spoke wire is 2.90c, Pittsburgh or Cleveland, and on basic wire 3.40c, Pittsburgh or Cleveland. The former product was reduced at four principal basing points at a like amount and the latter at three bases. Meanwhile, merchant, annealed and galvanized fence hold steady. Wire product buying appears slightly heavier.

Cleveland—Tonnage booked by wire manufacturers here has improved moderately, with most orders coming from miscellaneous manufacturing lines. Nut and bolt manufacturers, having ample stocks, have not yet started to buy in anticipation of larger demand from the automobile industry.

Chicago—While activity in wire and wire products is fairly steady, little additional improvement was noted the past week. The outlook in wire products is rather poor for the remainder of the quarter. Both consumers and jobbers are attempting to keep inventories low. Additional price reductions of $6 a ton have been announced for spoke wire and high carbon wire.

Boston—Recent slight improvement in wire demand continues and some mills have increased drawing operations. Consumer stocks are low, but buying continues close to immediate requirements.

Philadelphia—Consumers of wire and wire products are buying lightly.

Semifinished

Semifinished Prices, Page 63

Despite recent reductions of $6 a ton on high carbon spring wire, spoke wire and basic wire, it is not expected that the $38 price on wire rods will be affected. Neither is there any change anticipated for first quarter on sheet bars at $28, Pittsburgh, or billets at $27. Philadelphia forging shops are busy on alloy forgings for the navy.

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Pig Iron

Pig Iron Prices, Page 64

Pittsburgh — Although consideration of first-quarter prices on pig iron is several weeks distant, it is generally conceded that no change will be made from existing market of $18.50, Neville Island, for foundry grades, $18.00 on basic and $19.00 on bessemer. Meanwhile, buying continues distinctly hand-to-mouth and melters will not obligate themselves for even their coming month's requirements. Only one merchant furnace is on here. Reports here last week were that American Steel Foundries soon would reopen its Verona, Pa., plant, closed for three years.

Cleveland—November promises to develop further improvement in production and shipments of merchant pig iron. The movement so far this month is approximately 10 per cent larger than that in the comparable period in October. Foundry coke shipments also are increasing, responsive to the larger melt, notably in automobile foundries. Current orders for pig iron are more frequent, though few exceed 300 tons.

The state highway commission, Columbus, O., is taking bids Nov. 16 on the Rocky river, Cuyahoga county (Cleveland) bridge, which includes 67,000 pounds of steel castings and 83,900 pounds of malleable iron castings.

Chicago — Pig iron demand is more diversified, with more spot orders for prompt delivery. Most consumers have reduced inventories sufficiently to necessitate additional shipments as the result of moderate betterment in consumption. Farm implement and stove and range foundries hold recent gains in production. No. 2 foundry and malleable pig iron continue $18.50, furnace.

Boston — Sales of iron are up slightly with the outlook improved at several foundries, including two textile mill plants where melt has been increased. Several jobbing foundries also have heavier schedules.

New York—While stovemakers are consuming less iron, jobbing foundries are melting possibly 5 per cent more than a fortnight ago. Orders still reflect only the immediate needs of the consumers. Delivery is an important factor in much of the pig iron being bought.

Philadelphia — Pig iron sales since Nov. 1 have been slightly more numerous, although no large single tonnage has been involved. Consumers, apparently, are continuing to buy only for immediate requirements. Prices appear steady, with no increases expected when first quarter prices are filed around Nov. 20.

Buffalo — Demand for pig iron continues on an upward trend although buying is limited. The foundry melt is substantially better and individual inquiries are larger. Four furnaces continue in blast. Some shipments still are to be made by water.

Cincinnati — Sales of pig iron show gains, with a decided improvement in sentiment among melters. Orders, however, likely will be restricted to small lots, at least until after Dec. 1. Quotations are firm and unchanged.

St. Louis—A slight slowing down is noted in new buying and shipments. Sales are mainly foundry grades.

Birmingham, Ala. — Production, with four blast furnaces on, still exceeds demand. A few foundries are improving output but average requirements are limited. Stove foundries have been buying some iron. Surplus stock of pig iron is unchanged.

Toronto, Ont. — Minor expansion is reported in pig iron demand in the Canadian markets. Sales are gradually increasing in number, although melters continue to take iron in single car lots. Repeat orders are appearing more often. Daily melt is holding at about 35 per cent.

Scrap

Scrap Prices, Page 65

Pittsburgh—As a number of railroad scrap lists were offered last week, thus providing more readily available material to the market, a down-river mill purchased several thousand tons of No. 1 heavy melting steel at $10.75, delivered. The local scrap situation definitely shows signs of having turned from a buyer's to a seller's market.

Cleveland—Buying of open-hearth scrap in the Valley has strengthened prices here but has caused no changes in quotations. Shipments here are at a minimum and only a few sales of miscellaneous grades are being made.

Chicago — Scrap prices are strong as indicated by quotations on recent railroad lists. While expectations are

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for higher levels mills show little interest and at least one steelworks has indicated it will not buy again this year. Heavy melting steel is nominally unchanged at $8.50 to $9. Other quotations also are unchanged but strong.

Boston—Steel works are making no effort to meet prices paid for heavy melting steel for export. Buying continues brisk for boat shipment. Dealers are paying $8.25, dock, for No. 1 and $7.25 for No. 2. Axle turnings and heavy cast are firmer.

New York—Scrap buying continues largely for export, with more heavy melting steel being sold at $8.50 and $7, barge, for No. 1 and 2, athough dealers are reluctant to set these prices as the market. Meanwhile the domestic outlook has improved with better prices being bid for railroad steel. Two Buffalo consumers have also bought, paying $9.50 to $10 for No. 1 steel delivered.

Philadelphia—Improved sentiment in scrap is reflected in slightly increased activity and higher prices on four grades. Heavy breakable cast is now holding at a flat level of $10, delivered; No. 2 heavy melting steel, at $8 to $8.75, as against $8 to $8.50, recently; and steel shafting, $16 to $16.50, against $16. The market on heavy breakable cast was formerly $9.50 to $10.

Buffalo—Scrap purchases have been checked after a fair tonnage has been accumulated by consumers of specialties. Stove plate, cast, short steel rails, machine shop turnings and several other grades were sold in fair volume.

Detroit — Scrap has a strong undertone but this has not been translated into higher consumer prices, due to the lack of sales. Advances are anticipated within the next 30 days.

Cincinnati—The iron and steel scrap market is somewhat stronger, even though mill buying is absent.

St. Louis—Purchasing if iron and steel scrap continues at the low levels of recent weeks, though shipments are fairly steady and sentiment hopeful. Prices are quotably unchanged.

Birmingham, Ala. — The market shows no improvement and the situation is agitated by shipments from the lower part of the state and elsewhere by consumers.

Seattle—Steel scrap shipments to the Orient are large but they are on old commitments. The market still is soft, due to unstable Japanese exchange. Exporting houses are awaiting adjustment of the price situation and in the meantime are replenishing stocks.

Toronto, Ont.—Trading in iron and steel scrap shows little change. Demand is specialized with the greatest movement in iron grades. Steel mills are out of the market except for small tonnages of special grades.

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Metallurgical Coke

Coke Prices, Page 63

Beehive coke sellers have reaffirmed for November the present market of $3.85 per ton, Connellsville, Pa., on standard furnace grades, $4.60 per ton for common foundry brands and premium foundry coke at $5.10 to $5.35.

Jones & Laughlin Steel Corp., Pittsburgh, in naming eastern and mid-western distributors last week, entered the by-product coke market for domestic use for the first time. In the Pittsburgh district, at least, this move in a sense replaces the retirement of Carnegie Steel Co.'s Clairton coke from the market last spring.

Movement of foundry coke at Cleveland and Chicago has increased rather heavily. Foundry coke, delivered in New England, has been advanced to $11. Cincinnati coke producers find foundry coke demand steady and domestic grades in greater demand. Birmingham ovens are receiving heavier orders.

Ferroalloys

Ferroalloy Prices, Page 64

New York—With $85, duty paid, Atlantic and Gulf ports, virtually assured for the remainder of the year, attention in the ferromanganese trade is centered on the possibility of an increase in prices for first quarter. Such increase would be the first in a year. Manganese ore prices have advanced several cents a unit since the present price on ferromanganese became effective. Stocks of manganese ore in bonded warehouses here are fairly substantial but there has been a material decrease in the stocks this year. At the end of 1933, according to government statistics, bonded stocks totaled 490,819 long tons, containing 238,040 tons of metallic manganese, compared with 622,489 long tons, containing 299,504 tons of metal, at the close of 1932.

Domestic spiegeleisen, 19 to 21 per cent, is $26, furnace on lots up to 50 tons, and $24 on 50 tons and more. Trading is featureless.

Warehouse

Warehouse Prices, Page 66

Pittsburgh—November promises to show the third successive monthly increase in shipments of warehouse steel.

Cleveland—Some leading warehouse interests here note a smaller volume of business so far this month than for the same period in October.

Chicago—While sales are well maintained and compare favorably with conditions a year ago, the tendency is slightly downward.

Boston—Most jobbers report No-

vember volume holding to the October rate, the best in several months.

New York—Warehouse volume is slightly below last month's rate with most jobbers, although the number of orders is holding well. Prices are firm and unchanged.

Philadelphia—Jobbing demand appears about equal to that of last month, the best this half. Proportionately, demand from warehouse is better than buying from the mills.

Detroit—Warehouse sales in November are at about the same rate as in October and automotive needs indicate a continuance. Prices are unchanged.

Cincinnati—Sales of warehouse steel show little variation from October. Prices are firm and unchanged.

St. Louis—Reports of local warehouse interests indicate October sales substantially ahead of the preceding month and the corresponding period a year ago. The comment is made that profit margins are being more closely drawn.

Seattle—The market is quiet. Volume is small and sales are in small tonnages, largely for public projects. Prices are firm.

Steel in Europe

Foreign Steel Prices, Page 66

London—(*By Cable*)—November has brought increased demand for strip sheets in Great Britain, the automobile industry showing renewed activity. On the other hand, orders for structural steel are less than a month ago. Pig iron producers in all districts have contracts running into second half of 1935, with specifications for delivery sufficient to absorb current output. Galvanized sheets are quiet.

The Continent reports merchant steel active. Some buying is being done for the Far East but demand is quieter. German steelworks are well employed.

Nonferrous Metals

Nonferrous Metal Prices, Page 64, 65

New York—Nonferrous metal markets were generally quiet during last week with the price trend mixed. Lead and zinc were easier while antimony was unusually strong, advancing to the highest point in years.

Copper—Sales showed a slight improvement over those of the previous week. The price held uchanged on the basis of 9.00c, Connecticut, for electrolytic. Observers expect no price change in the immediate future and believe that even a sharp drop in European copper would not actually threaten the domestic price level.

Lead—Slow buying and declining prices were a reversal of the October trends. An increase in total stocks of refineries on Oct. 1 was reported. Quotations were cut $1 a ton Monday

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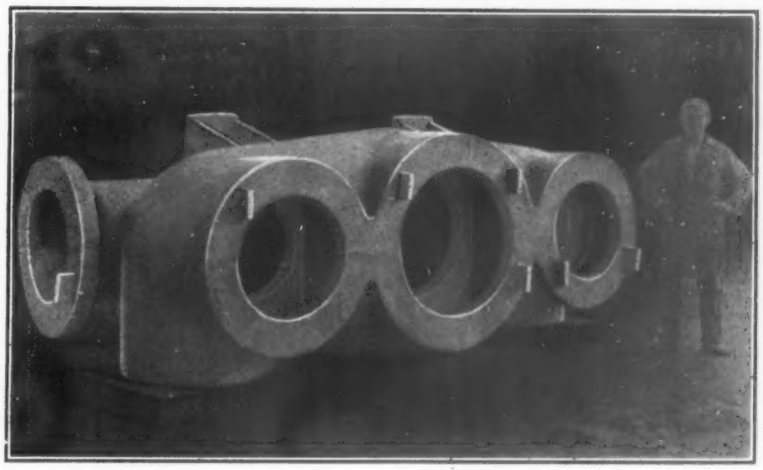

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and again by the same amount on Wednesday. Final spot quotations for the week were 3.60c, New York, and 3.45c, East St. Louis.

Zinc—Prime western eased on Monday to 3.75c, East St. Louis. Domestic stocks of refined zinc rose 4233 tons during October. Slow demand further weakened the price.

Tin—Consumers continued to keep well out of the market and are believed well covered for the balance of the year. Sales were confined to small lots and chiefly to spot or prompt positions. Straits prices tended upward on a rising pound sterling exchange. The market closed near the 51.25-cent level.

Aluminum—Virgin metal remains steady with 99 per cent holding unchanged at 19.00c to 21.00c, del.

Antimony—Prices moved upward rapidly, principally on European buying and domestic inquiry. The metal rose to a high of 11.75c to 12.00c on Thursday.

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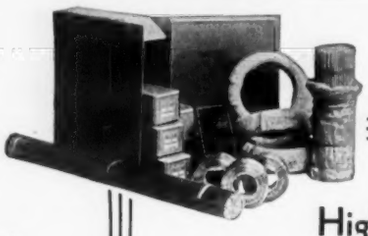

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Equipment

Pittsburgh — United Engineering & Foundry Co. has begun work at its Youngstown, O., division on a contract awarded ten days ago by Carnegie Steel Co., for a 42-inch, 4-high, continuous strip mill. This mill, with yearly capacity of 360,000 to 420,000 tons of hot-rolled strip steel, is expected to be installed and in operation by the third quarter of 1935. It will produce strip steel in cut lengths and coils up to 38 inches wide and down to 16 gage, as well as down to 18 gage in widths up to 24 inches. Complete facilities for pack annealing, slitting, oiling and pickling cut lengths are to be included in the new rolling unit. Activities in other phases of the steel mill equipment market are far from sustained. Many buyers are still displaying a cautious attitude on capital expenditures.

New York — Heavy inquiry for federal government departments, notably arsenals and navy yards, features the demand for machinery. Bids are now in on equipment for three vocational schools, New York, with bids closing this week on a fourth at Staten Island. More than 500 machines, including considerable woodworking equipment, are included in these lists and but a slight part of the business has been placed.

Boston — Inquiry for machinery and plant equipment is slightly heavier. While being figured, a good part of the business is not likely to be placed until after the end of the year. Several machine building shops in New England have booked orders to enable a slight increase in operations. Textile mill equipment builders have not recovered from the slump which developed shortly before the textile strike.

Chicago — Equipment and machinery sales show little change, in most cases continuing at the low rate of October. This applies to small miscellaneous tools as well as to heavier equipment. In some instances purchases have been dictated entirely by necessity and have not been preceded by formal inquiries. Purchases during the balance of the year are expected to be influenced partly by the desire to hold inventories low. Railroads are not counted on for new business pending a definite change in business conditions. Farm implement manufacturers provide one of the bright spots in prospective equipment buying, with some machine tool inquiries pending for this group and for tractor manufacturers.

Construction and Enterprise

New England

SALEM, MASS.—Eastern Products Co. has been organized to manufacture machinery and parts, by Richard E. Blake, 70 Washington street.

CRANSTON, R. I. — Narragansett Brewing Co. will take bids soon on a 2-story bottling plant to cost $40,000. E. M. Corbett, 49 Purchase street, Fall River, Mass., is architect.

PAWTUCKET, R. I.—City, A. J. Lamarre, commisioner of public works, city hall, plans construction of an activated sludge sewage disposal plant to cost $1,000,000. T. E. Harding is city engineer.

New York

BROOKLYN, N. Y.—Bush Terminal Co., 451 First avenue, has plans by the Nicholson Co., 405 Lexington avenue, for concrete coal pockets on Forty-seventh street, with elevating and conveying machinery, to cost $28,000.

BROOKLYN, N. Y.—Roosevelt Coal Corp., 215 Forty-third street, has plans by H. Harriman, 59 Bank street, for a concrete coal pocket at Smith and Mill streets, to cost $28,000, including elevating and conveying machinery.

FLUSHING, N. Y.—Fleer Bros., 218 Tompkins avenue, Brooklyn, N. Y., plans a coal-handling plant, loaders and pockets at Lawrence street and Flushing river, to cost $28,000, including elevating and conveying equipment. W. Stocker, care owner, is architect.

MOUNDSVILLE, N. Y.—Village will take bids soon on construction of a waterworks system for which $52,000 has been voted.

NEW YORK—Everlast Metal Products Corp. has been organized to deal in metal products, by Bregman & Bregman, 10 East Fortieth street, New York.

NEW YORK—Forman Machine & Electric Corp. has been formed by David Geiger, 521 Fifth avenue, New York, to manufacture machinery.

WEBSTER, N. Y.—Rochester Gas & Electric Co., Rochester, N. Y., plans extensions of its power transmission lines at Webster and in its vicinity, at cost of about $50,000.

Ohio

CINCINNATI—Oliffrich Brewing Co., 242 West Michen street, has plans by Fosdick & Hilmer, architects, Union Trust building, for a powerhouse costing over $40,000.

CLYDE, O.—Clyde Motor Products Co., A. C. Burch, Sandusky, O., president, has leased space and equipment at Clyde for assembling diesel-engined motor trucks on which experimenting has been under way the past two years.

COLUMBUS, O.—Imperial Casket Co. has been formed by Samuel Levin, and is planning to purchase band saws and planers.

COLUMBUS, O.—National Electric Coil Co., manufacturer of electric coils for motors and generators, has moved its plant here from Bluefield, W. Va. Work of installing machinery is practically completed.

GNADENHUTTEN, O.—Village plans to build a waterworks plant on PWA loan of $49,000. Arnold, Rosch & Hartlein, New Philadelphia, O., are engineers.

LANCASTER, O.—Lancaster Carbon Co., recently incorporated by Howard B. Hileman and J. F. Furniss, both of Lancaster, and J. R. Cole, Columbus, O., has acquired the factory, machinery and equipment of the Carbon Products Co., which it hopes to put in operation again soon.

ST. BERNARD, O.—Cincinnati Chemical Co., Cleaneay avenue, Norwood, Cincinnati, has plans for a 1-story powerhouse at its plant in St. Bernard, costing $35,000. William E. Bodenstein, Second National Bank building, Cincinnati, is consulting engineer.

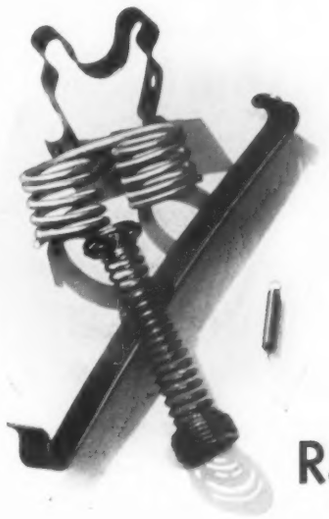
Michigan

BENTON HARBOR, MICH.—Motors and controls, conveyors, electric hoists, refrigerating machinery, air compressors and other equipment will be installed in new cold storage and pre-cooling plant at Benton Harbor, for company now in process of being organized, headed by George H. Kittredge, care of George B. Bright, 2613 Twelfth street, Detroit, engineer. Cost is approximately $75,000.

DETROIT—North American Distilleries Inc., Edward A. Loveley, president, Tenth floor, Michigan Theater building, recently incorporated, is planning to erect a distillery near St. Clair, Mich., on the St. Clair river.

DETROIT—Ryniewicz Bros. & Co., 2648 Botsford street, has been organ-

RAYMOND



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ized to manufacture tools, by C. F. Richards, 271 Eliot street.

ST. CLAIR, MICH.—Diamond Crystal Salt Co. is having plans prepared for two additional factory units, and will take figures about Nov. 1.

WAKEFIELD, MICH.—R. Connor Co. has started construction of mill buildings near Wakefield, including 50 x 170-foot saw mill, shingle mill, lath mill, machine shop and other buildings. The building project will also provide for installation of an 800-horsepower engine and several boilers. Gordon Connor is in charge of construction.

YALE, MICH.—Yale Woolen Mills is having plans prepared by Austin Co., Detroit, for an addition, 120 x 205 feet, to its factory.

Illinois

CHICAGO—Continental Iron & Metal Co., 1401 Steuben building, has been incorporated by S. D. Missner, L. A. Roberts and N. H. Feingold, to deal in metals. Correspondent: Sidney N. Missner, 188 West Randolph street.

CHICAGO—National Address Plate Corp., 4535 Ravenswood avenue, has been incorporated by Ira Hill, Frank Keller and Paul T. Rosenthal, to manufacture metal stampings. Correspondent: Coburn, Kearney and Coburn, 32 West Randolph street.

CHICAGO—Dearborn Paper Co., 860 Rees street, will install motors and other electric power equipment in a new one and two-story plant at Twenty-first and Loomis streets, 130 x 460 feet, to cost $60,000. J. M. LaPoint is company engineer. (Noted Oct. 29.)

CHICAGO—Steelox Co., 39 South La Salle street, has been incorporated by James W. Swank, Edward R. Sickle and Ray M. Calkins, to manufacture and fabricate iron, steel, manganese, coke, copper, lumber and other materials. Correspondent: Ray M. Calkins, 39 South LaSalle street.

CHICAGO—Republic Smelting & Refining Co. Inc., 3719 South Kedzie avenue, has been formed by Harry E. Weiss, Gertrude Plotkin and Sol Goldstein, to smelt, refine, assay and manufacture copper, lead, spelter, antimony and mixtures of these materials. Correspondent: Irving S. Roth, Burnham building, 160 North LaSalle street.

CHICAGO—Mars Inc., candy manufacturer, 2019 North Oak Park avenue, is expending $200,000 for new buildings and equipment. Campbell, Lowrie, Lautermilch Corp., 400 West Madison street, Chicago, is general contractor for erection of a 65 x 360-foot box factory and storage building, a 60 x 100-foot building for rest rooms, lockers, etc., and a 40 x 40 addition to the boiler room. Two new boilers are to be installed, about $40,000 being spent for equipment.

COLCHESTER, ILL.—Bids will be taken Nov. 20 for a waterworks plant to cost $76,500. L. B. Decker is city clerk.

POLO, ILL.—City plans construction of a sewage disposal plant to cost $36,000. Suhr, Berryman, Peterson & Suhr, 130 North Wells street, Chicago, are engineers.

Alabama

MOBILE, ALA.—Kraftliner Gumming Corp., a new subsidiary of the Southern Kraft Corp., Mobile, Ala., will install electric power equipment in a new plant which is to cost $100,000. Arnold Jacoby is general manager.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Nov. 16, schedule 3653, motor-driven universal milling machines, delivery Brooklyn, N. Y., and Philadelphia; schedule 3672, one motor-driven, single spindle type automatic screw machine, delivery Newport, R. I.

Maryland

BALTIMORE—James Distillery, Key Highway and Montgomery street, is planning to erect a 2-story building and additional units.

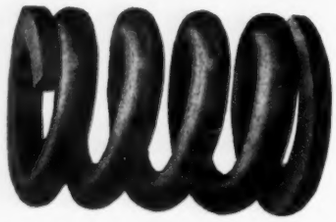
SECRETARY, MD.—Town is planning water supply and distribution system, consisting of well, pumping station, elevated storage tank, etc., to cost about $21,000. J. R. Cronister, engineer, Hyattsville, Md.

Tennessee

KNOXVILLE, TENN.—City, W. W. Mynatt, city manager, has almost completed plans and specifications for constructing municipal power distribution system and will accept bids soon for first unit.

MEMPHIS, TENN.—A $9,000,000 bond

FORT PITT SPRING COMPANY



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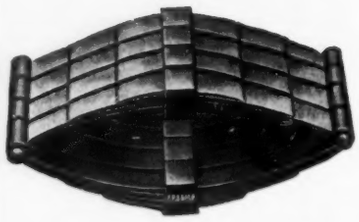

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issue has been authorized by voters for a municipal power plant.

West Virginia

LEWISBURG, W. VA.—Town, W. W. Foster, mayor, will receive bids Nov. 26 for waterworks improvements consisting of a 200-gallon per minute oil engine driven pumping unit, 250,000-gallon filter plant, enlarging pumping station, water piping for pumping station and additions to water distribution system in town.

LIMESTONE, W. VA.—Garage and machine shop of N. H. Wiseman recently sustained damages by fire.

Virginia

RICHMOND, VA.—Dixie Distilling Co. has been incorporated by Carl R. Mahaley and C. M. Little, to operate a distillery.

RICHMOND, VA.—Virginia Rural Rehabilitation Corp. is planning to remodel brick cannery at 1236 Hermitage road, to cost about $18,000.

Missouri

CANTON, MO.—United States government, war department, Maj. R. A. Wheeler, district engineer, Federal building, Rock Island, Ill., will receive bids until Nov. 27 for a traveling tainter gate hoist for lock and dam No. 20 in the Mississippi river.

KANSAS CITY, MO.—Eagle Bottling Works, 1903 Cherry street, Harry Rubenstein, president, will install power equipment in a new plant which will cost about $225,000. A. B. Anderson is architect and George Wentzel is engineer, both Davidson building, Kansas City, Mo. (Noted Oct. 22.)

ST. CHARLES, MO.—Board of public works has accepted the bid of A. H. Stiel Inc. for construction of new filtration plant and extensions and improvements of the St. Charles waterworks. Work will begin as soon as approval of the St. Charles city council is given, and it is estimated the project will be completed in February or March.

Texas

AUSTIN, TEX.—State legislature passed bill providing for $30,000,000 development in Brazos river valley, involving construction of hydroelectric projects, flood control, etc. The bill would also create the Colorado river authority for the purpose of completing the Buchanan dam and power plant.

BIG SANDY, TEX.—City will open bids Nov. 16 for waterworks and sewers, including elevated storage tank. Has loan and grant of $63,000.

Wisconsin

ADAMS, WIS.—Special election will be held here Nov. 20 to vote on $110,000 PWA allotment for municipal waterworks and sewage plant. A. J. Walczyk is city clerk. A. E. McMahon, Menasha, Wis., is consulting engineer.

MADISON, WIS.—Oscar Mayer Co., North street, Adolph C. Boltz, vice president and manager, has awarded contract to Fritz Construction Co. for a cooler addition at its packing plant to cost about $50,000.

MILWAUKEE—Lupinski Inc., 100 East Capitol drive, is successful bidder for erecting new sand blast building at West Milwaukee shops of Chicago, Milwaukee, St. Paul & Pacific railway. F. M. Sloane is district engineer.

Minnesota

DULUTH, MINN.—Universal Atlas Cement Co. plant here will resume operations about Nov. 15, to fill a large order in connection with construction of the Fort Peck dam.

DULUTH—American Steel & Wire Co.'s plant has been awarded a contract by the Minnesota state highway department to furnish 124,310 steel snow fence posts. Production has already been started on rolling and fabricating. About 600 tons of steel will be required.

ROCHESTER, MINN.—Public utility board will soon take bids for construction of power plant 54 x 78 feet, to cost $95,000. Schuett-Meier Co., 490 North Snelling avenue, St. Paul, is engineer.

ST. PAUL — Goodrich-Gamble Co., manufacturing chemist, has awarded contract for construction of a 2-story factory addition, 30 x 40 feet and 20 x 30 feet.

ST. PAUL—American Hoist & Derrick Co., manufacturer of hoisting and earth moving machinery, including power hoists, steel derricks, locomotive

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cranes, shovels, etc., has started production of a new line of snow plows for operation by trucks.

ST. PAUL—Seeger Refrigerator Co., Walter Seeger, vice president, 850 Arcade street, plans to install electric power equipment in additions to the refrigerator manufacturing plant for which building permits have been obtained. Cost is estimated at $75,000. C. H. Johnson, 360 Robert street, is architect. (Noted Sept. 17.)

Nebraska

HASTINGS, NEBR.—City will soon take bids for a turbine for the municipal light and power plant. L. T. Waterman is city clerk. Black & Veatch, 701 Mutual building, Kansas City, Mo., are engineers.

NELIGH, NEBR.—Department of roads and irrigation plans to build a new maintenance garage and machine shop to replace the one burned Oct. 18. A. T. Lobdell, state house, Lincoln, Nebr., is acting state engineer.

OMAHA, NEBR.—Lewis Packing Co. has been incorporated with capital stock of $200,000, to build and operate a packing plant, by Sam J. Leon and Lazar Kaplan.

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Iowa

MUSCATINE, IOWA—United States government, war department, Maj. R. A. Wheeler, district engineer, Federal building, Rock Island, Ill., will receive bids until Nov. 27 for construction of dam No. 16 in the Mississippi river, including movable gate section, spillway, cofferdams, roller gates, tainter gates, service bridge, operating machinery, etc. Approximate requirements of steel include 168,500 square feet of steel sheet piling, 2415 tons of shapes, 1280 tons of reinforcing steel, 62 tons of steel forgings, 117 tons of steel castings and small quantities of iron castings, handrails and crane track.

Colorado

LA SALLE, COLO.—City council plans a special election on a bond issue of $42,000 for a municipal electric light and power plant with diesel equipment.

PUEBLO, COLO.—Trustees of Pueblo waterworks, D. Porter, superintendent, 319 West Fourth street, will take new bids soon, old bids being rejected, on three complete pumping units, vertical centrifugal type, direct connected to electric or gasoline motors.

Pacific Coast

SACRAMENTO, CALIF.—Voters of Sacramento county have authorized the issuance of $12,000,000 bonds for a municipal power plant.

STOCKTON, CALIF. — Riverbank Canning Co. has acquired a ten-acre site here on which it will erect a new cannery. Lorenzo Zerillo is president.

COULEE CITY, WASH.—Washington Water Power Co. is adding a substation to its local plant, installing overhead switches, enlarging the yards and constructing additional towers to provide 110,000 volts on two lines.

SEATTLE—Bosworth Inc. has been formed by Fay Bosworth and associates, 314 Seaboard building, to manufacture machinery, tools, etc.

SEATTLE — Instrument Laboratory Inc. has been organized by Frank J. Lillis and associates, 4557 Latona avenue, to produce electrical and mechanical instruments.

SEATTLE—Colby Crane & Engineering Co. has contract for a Colby high-speed lumber handling crane, hammerhead type, with an 80-foot boom, for installation in the new mill of Boedel, Stewart & Welsh at Alberni, B. C.

Dominion of Canada

STEWART, B. C.—Power house of the Premier Gold Mines, Portland canal district, recently sustained damage by fire, causing a complete shutdown.

EAST WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Wallace R. Campbell, president, is taking bids for installing and equipping a new $425,000 electric furnace foundry at its plant here. Plans provide for further expansion.

ST. CATHARINES, ONT.—City plans to extend its sewage disposal plant at cost of about $150,000. B. A. Lamson is city engineer.

TORONTO, ONT.—City council has retained Metcalf & Eddy, Boston, and Nasmith & Storrie, Montreal, Que., as consulting engineers to report on location of a sewage disposal plant to cost an estimated $20,000,000.

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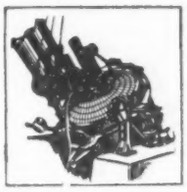
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U. S. Steel Corp.

	Automobiles		Shipments		Fabricated Shapes‡		Fabricated Plates			Foundry Equipment Order Index†
	Units Production —United States—			To consumers only, inter-company shipments not included	Net Tons			Net Tons Bookings Oil Storage		
1933	Total*	Passenger cars	Canada Total	Tons	Bookings Tonnage	Shipments Tonnage	Total	Tanks	Miscellaneous	
Jan.	129,478	110,180	3,358	285,138	73,679	50,965	11,128	1,501	8,830	68.4
Feb.	105,933	90,425	3,298	275,929	50,955	46,168	16,588	8,347	7,660	16.1
March	115,985	97,782	6,632	256,793	71,398	54,948	8,903	1,270	6,787	9.8
April	177,059	150,515	8,255	335,321	46,095	50,387	9,502	2,938	6,291	19.4
May	214,832	181,927	9,396	455,302	42,600	63,968	16,243	2,858	8,183	25.7
June	250,290	209,083	7,323	603,937	81,910	64,809	37,020	20,894	14,013	45.5
July	230,140	192,894	6,540	701,322	56,482	51,303	20,058	6,013	11,417	48.6
Aug.	233,825	193,111	6,079	668,155	78,379	67,913	16,320	2,581	10,618	56.2
Sept.	192,613	158,678	5,808	575,161	57,642	64,362	16,025	1,033	13,602	34.9
Oct.	134,956	105,685	3,682	572,897	53,695	73,139	17,839	1,434	12,162	42.46
Nov.	61,031	41,066	2,291	430,358	60,896	56,023	14,466	3,734	9,466	36.62
Dec.	81,114	50,621	3,262	600,639	83,799	56,388	13,692	2,160	9,819	43.2
Year	1,927,256	1,581,967	65,924	5,805,235	757,530	700,373	199,031	55,025	119,569	.....
1934										
Jan.	156,907	113,331	6,904	331,777	74,358	46,774	15,897	3,754	10,512	37.2
Feb.	231,707	187,639	8,571	385,500	60,036	38,101	14,641	2,476	10,452	65.8
Mar.	331,263	274,722	14,180	588,209	82,250	50,685	38,924	2,202	33,806	75.4
Apr.	354,745	289,030	18,363	643,009	98,383	66,782	20,085	2,998	13,447	67.8
May	331,641	273,765	20,161	745,063	62,391	82,735	21,891	8,746	10,802	66.3
June	308,065	261,852	46,213	985,337	97,390	81,877	27,395	11,019	13,642	70.4
July	266,576	223,868	42,708	369,938	57,234	80,326	12,523	2,028	7,901	50.7
August	234,809	183,500	51,309	378,023	73,559	95,864	16,293	3,334	10,855	43.1
Sept.	168,872	123,909	44,963	370,306	48,701	80,869	15,108	3,445	8,218	46.4
9 Mo.	2,384,596	1,931,616	452,615	4,797,162	654,302	624,013	182,757	40,002	119,635	....

*Difference of total and passenger cars equals number of trucks. †Average monthly shipments, 1922-23-24 taken as 100
‡Figures by American Institute of Steel Construction, from January, 1933, 75 to 85 per cent of industry reporting.

	Malleable Castings			Steel Castings		Mech. Stokers		Steel Furniture		Babbitt Metal	
	Net Tons			Net Tons		—Sales—		Dollars 000 omitted		Pounds 000 omitted	
1933	Output	Shipments	Orders booked	Total bookings	Total production	Fire tube boilers	Water tube boilers	Business shipments	Shelving, shipments	(a) Total production	(b) Sales
Jan.	12,577	14,248	12,404	14,450	15,378	55	13	582	121	1,346	1,073
Feb.	13,575	14,068	11,077	13,179	13,802	38	23	464	104	1,117	917
March	9,756	10,967	12,380	13,178	14,896	69	17	482	137	1,134	941
April	17,871	16,666	17,856	15,942	13,492	28	34	404	133	1,544	1,270
May	24,628	23,077	24,671	22,612	20,751	54	44	511	166	2,110	1,785
June	31,118	29,268	31,997	34,965	29,455	147	50	636	165	2,327	1,877
July	30,865	29,155	28,458	31,878	31,718	110	67	522	156	2,484	1,941
August	31,811	30,195	28,323	31,502	33,834	157	61	693	178	2,753	2,059
Sept.	27,078	25,402	22,744	25,220	28,087	175	28	734	163	2,419	1,803
Oct.	24,381	20,422	19,933	26,135	27,826	147	31	825	146	2,090	1,554
Nov.	21,903	19,722	20,776	25,558	24,721	142	40	799	195	1,963	1,606
Dec.	21,870	22,300	26,305	25,612	23,718	109	13	1,040	202	1,459	1,043
Year	268,617	256,419	258,082	280,231	277,678	1,231	421	7,697	1,870	22,812	17,876
1934											
Jan.	30,417	26,642	32,501	26,296	27,644	100	23	996	214	2,256	1,838
Feb.	33,939	31,412	36,594	35,698	28,526	49	25	894	279	2,147	1,715
March	43,438	41,530	42,961	60,044	39,475	62	43	955	394	2,474	1,976
April	40,742	39,817	38,453	63,142	46,242	48	39	934	346	2,527	1,964
May	37,165	39,493	32,639	46,831	57,313	110	35	1,010	288	2,425	1,889
June	28,340	31,607	24,499	41,537	50,268	117	52	1,045	354	2,261	1,618
July	23,388	27,591	21,862	41,822	46,182	121	68	863	230	1,988	1,435
August	23,910	25,784	21,306	25,538	43,748	183	49	1,101	225	1,856	1,399
Sept.	21,541	20,360	19,511	20,030	31,816	240	40	879	260	1,653	1,273
9 Mo.	282,880	284,236	270,326	360,940	371,230	1,030	374	8,680	2,595	19,590	15,111

(a) by 40 plants. (b) by 30 manufacturers who produce for sale, including 5 who also report consumption of own metal.

	Coke		Electric Power	Steel Barrels		River Traffic			Steel Boilers		
	Net Tons Production		Millions Kilowatt Hours	Units		Net Tons			Units		
1933	By-Product	Beehive	Production*	Production	Shipments	Allegheny	Monongahela	Ohio	Total	Stationary	Marine
Jan.	1,784,527	81,900	6,932	341,382	341,055	1,627	11,724	18,002	197	189	8
Feb.	1,638,817	84,100	6,285	311,111	312,919	1,656	17,904	23,614	176	162	14
Mar.	1,666,035	93,300	6,674	427,562	425,682	425	19,546	32,917	195	186	9
Apr.	1,656,183	47,000	6,462	452,086	454,794	3,025	35,795	37,191	236	228	8
May	1,921,257	47,300	6,996	531,304	531,921	4,400	39,890	46,038	328	307	21
June	2,241,432	50,100	6,231	643,982	640,596	815	58,179	56,484	511	496	15
July	2,797,316	68,400	7,479	623,056	621,042	3,900	68,453	62,096	498	491	7
August	2,923,418	70,600	7,686	537,801	527,811	3,234	67,389	69,531	511	441	70
Sept.	2,712,050	59,500	7,347	580,471	585,842	2,000	43,026	38,480	447	442	5
Oct.	2,581,834	45,000	7,478	873,536	863,277	4,240	39,026	49,047	395	377	18
Nov.	2,334,597	92,800	7,243	638,850	644,954	1,550	28,216	39,573	296	291	5
Dec.	2,454,947	89,500	7,447	610,440	610,365	4,130	38,693	31,038	328	310	18
Year	26,722,400	829,500	85,269	6,571,581	6,560,258	31,007	467,841	509,011	4,118	3,920	198
1934											
Jan.	2,475,785	96,60 (	7,631	708,086	706,209	590	27,158	54,109	249	239	10
Feb.	2,493,494	118,300	7,049	573,391	572,915	520	12,429	4,373	212	198	14
March	2,968,573	149,700	7,717	695,681	703,101	2,180	40,685	47,897	294	283	11
April	2,875,451	60,800	7,443	657,185	658,216	5,100	51,995	72,974	380	361	19
May	3,191,869	51,300	7,683	494,051	489,186	3,050	72,922	73,361	304	294	10
June	2,989,875	50,700	7,472	701,826	696,349	10,195	54,913	83,718	415	402	13
July	2,381,459	50,700	7,605	598,745	608,644	2,950	41,231	60,005	455	452	6
August	2,279,672	43,700	7,707	361,852	364,081	2,015	32,412	45,840	597	584	13
Sept.	2,174,771	54,800	7,205	412,592	417,114	3,750	35,411	45,848	626	594	32
9 Mo.	23,830,949	676,700	67,512	5,203,487	5,215,953	30,350	369,156	488,125	3,535	3,407	128

*For public use.